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GAS LIGHT JOURNAL.

(ILLUSTRATED.)

DEVOTED TO THE INTERESTS OF

ILLUMINATION, HEATING, MECHANICAL, CHEMICAL

AND

GENERAL SCIENCE.

VOLUME LXXIX.

(FORTY-FIFTH YEAR.)

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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Eleventh Annual Meeting, Pacific Coast Gas Association.

PACIFIC COAST GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
SAN FRANCISCO, CAL., June 16, 1903.

The Eleventh Annual Meeting of the Pacific Coast Gas Association will be held in San Francisco, Cal., at the offices of the Pacific Gas Improvement Company, 455 Sutter street, Tuesday, Wednesday and Thursday, July 21st, 22d and 23d, 1903. The following papers will be read:

President's Address; by Mr. M. C. Osborn, San Francisco, Cal.

Wrought Pipe; by Mr. Franklin Riffle, San Francisco, Cal.

High Pressure Gas Distribution; by Mr. John A. Britton, Oakland, Cal.

Liquid Air: Its Application to the Gas Industry; by Prof. G. A. Bobrick, Los Angeles, Cal.

The Oil Industry of California from a Commercial Standpoint; by Dr. C. T. Deane, San Francisco, Cal.

Our Customers and Their Complaints; by Mr. D. Decker, Santa Rosa, Cal.

A Paper (subject to be announced later); by Mr. L. P. Lowe, San Francisco, Cal.

In addition to the above papers there will probably be contributions by at least two of the members on "Short Topics" of interest to the fraternity.

Arrangements have been made for a popular lecture on Liquid Air, by Prof. Bobrick, which will be given at the regular meeting place, Tuesday evening, July 21st, 1903. The lecture will be accompanied by experiments. It is the intention to make this lecture essentially a popular one, and members are cordially invited to bring their friends including ladies. Informality will be the order of the evening.

Wednesday evening, July 22d, will be the occasion of the annual banquet, to be held at Delmonico's, at which members only will be present.

On Thursday, July 23d, an all-day trolley car ride will be given and members will be conveyed by special cars to many points of scenic and historic interest in San Francisco and thereabout. An opportunity will also be afforded them to inspect at least one of the large power plants in the great Metropolis of the Pacific. Luncheon will be served at the Cliff House, and ample time will be allowed for a visit to Sutro baths (the largest in the world), or a stroll upon the beach. Following the usual custom, ladies will be welcome on the outing.

Through the courtesy of the Mechanics' Institute, arrangements have been made whereby the privileges of the Mechanics' Library, 33 Post street, are granted to all members of the Pacific Coast Gas Association during the period of its 11th annual meeting. Mr. J. M. Cummings, Secretary, acting for the Institute, extends to members a cordial invitation to make free use of the books and rooms of the Library, and will take pleasure in giving them any information or assisting them in any way in the use of the Library. It is hoped that members will show their appreciation by availing themselves of these privileges. No entrance tickets are required, but members will kindly wear the convention badge as a means of identification.

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JUL 8 1903
SMITHSONIAN DEPOSIT

Members are strongly urged to lend their individual support to

The Wrinkle Department: Mr. Geo. H. Colquhoun, Fresno, Cal., Editor.

The Experience Department: Mr. R. P. Valentine, Sacramento, Cal., Editor.

The Novelty Department: Mr. Geo. H. Hollidge, Merced, Cal., Committee in charge.

The Wrinkle and Experience Departments depend for their very existence upon the willingness of members to contribute, and are an index of the "lag" or "lead" of the Association as a whole. Please remember this and help to maintain the standard.

The Novelty Department is, in truth, a novelty this year. In it we hope to find samples or models of all the good things manufactured during the past year for which a "gas man" has use. If you know of any, communicate immediately with Mr. Hollidge.

The Question Box.—An effort is being made this year to give the Question Box the attention which it merits, and to this end a special communication has been issued on the subject. An immediate reply thereto is requested.

The Secretary will be glad to meet members and furnish information, at any time prior to the meeting, at 628 Rialto Building, San Francisco, Cal.

J. B. GRIMWOOD, Secretary.

BRIEFLY TOLD.

PERSONAL.—Mr. S. W. Garretson, who for the past 23 years has been actively connected with the lighting interests of the Pacific Coast, and for the past 14 years has been the General Superintendent of the Los Angeles Lighting Company, of Los Angeles, Cal., has severed his official connection with that Company in order to obtain a much needed rest and vacation. Upon presentation and acceptance of his resignation, the following resolutions were unanimously adopted by the Board of Directors:

"*Whereas*, Mr. S. W. Garretson has this day tendered his resignation as General Superintendent of this Company, and the same has been very reluctantly accepted; now, therefore, be it

"*Resolved*, That the thanks of this Board of Directors are most sincerely tendered to Mr. Garretson for his many years of unswerving devotion to this Company's interests; and,

"*Resolved*, That in the retirement of Mr. Garretson this Company loses an exceptionally able, upright and faithful officer, and that the very best wishes of this Board of Directors are cordially tendered to him for his future health, happiness and prosperity."

At the close of the meeting the President of the Company, Mr. W. B. Cline, on behalf of the Company, presented the retiring Superintendent with a handsome silver service. Mr. Garretson retires from his position with the well wishes and respect of all with whom he has come in contact, and leaves a vacancy which will be difficult to fill.

NOTES—

MR. GEORGE E. HARRIS, who was Manager of the Marshall (Mich.) Light Company since 1901, has resigned that post in order to accept the place of Eastern representative for the General Gas Light Company, of Kalamazoo, Mich.

WORK on the gas plant for South McAlester, I. T., has been commenced. The distributing plans call for the placing of 10 miles of mains.

THE Northwestern Gas Light and Coke Company, with headquarters in Evanston, Ills., we understand, has placed its stock on a 6 per cent. dividend basis. If such is the case, the simple fact speaks volumes for the success of its management.

MR. W. D. WEST has tendered his resignation as Manager of the Port Huron (Mich.) Gas Company. The plant at the named point will be reconstructed this summer.

THE gas rate at Attleboro, Mass., has been reduced to $1 per 1,000 cubic feet.

THE officers of the Houghton County Gas Company, Mich., are: President, W. W. Mercer; Vice-President, Robt. C. Faucett; Secretary, H. T. Ingersoll; Treasurer, Jas. T. Fisher. Franchises for the supply of gas in all the towns of Houghton county have been secured and the work of construction will be commenced immediately.

THE new gas rates established by the Newton (N. J.) Gas and Electric Company are: For lighting supply alone, $1.75 per 1,000; for lighting and fuel supply, $1.60 per 1,000; for fuel use alone, $1.35. Prompt payment secures a rebate of 10 cents per 1,000 on all classes of supply.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.—Concluded from Vol. LXXVIII., June 29, 1903; Page 1010.]

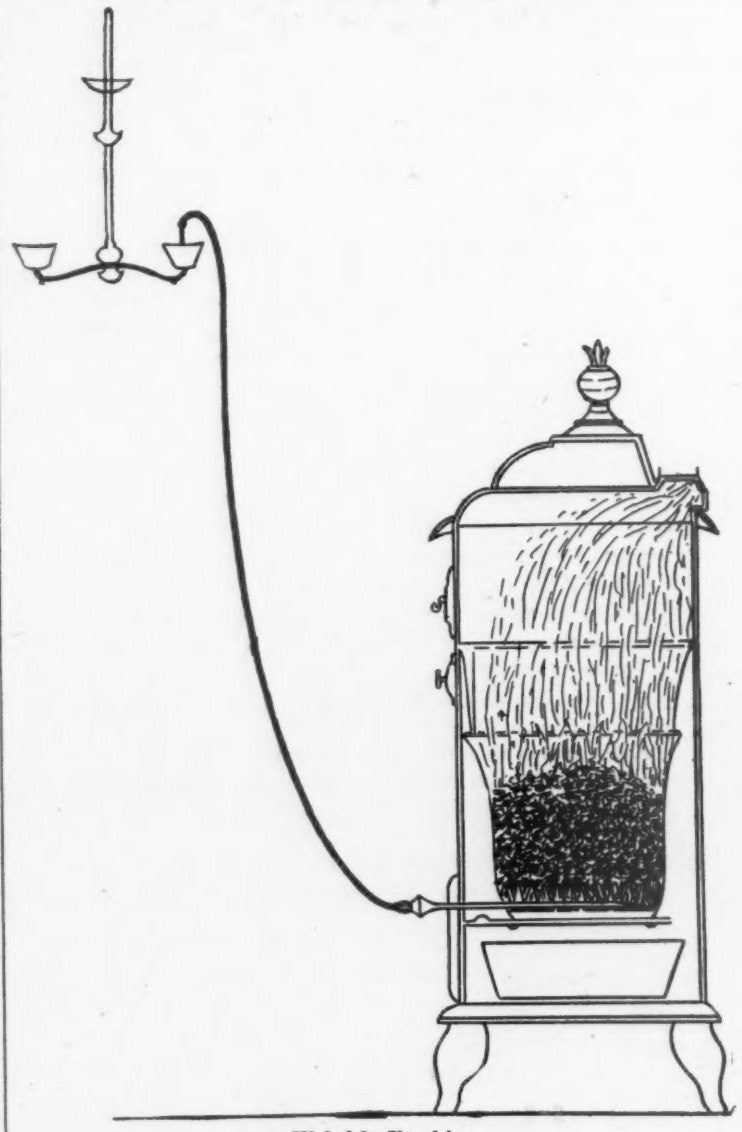
TWENTY-SIXTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD AT INDIANAPOLIS, IND., IN THE CLAYPOOL HOTEL, MAY 20, 21 AND 22, 1903.

SECOND DAY.—AFTERNOON SESSION.

WRINKLE DEPARTMENT.—*Concluded from Page* 1010, *June* 29.

No. 14.—*Bunsen for Lighting Fires.*—Mr. B. F. Perkins, of South Bend, Ind., sends Fig. No. 14, which shows a Bunsen for lighting coal fires, made out of a piece of ⅜-inch pipe, about 12 inches long, flattened at one end slightly and the other end fitted with an air chamber and a jet of suitable size, the outer end of which can be used as a nozzle for inserting into a flexible tube. The other end of the tube is attached to



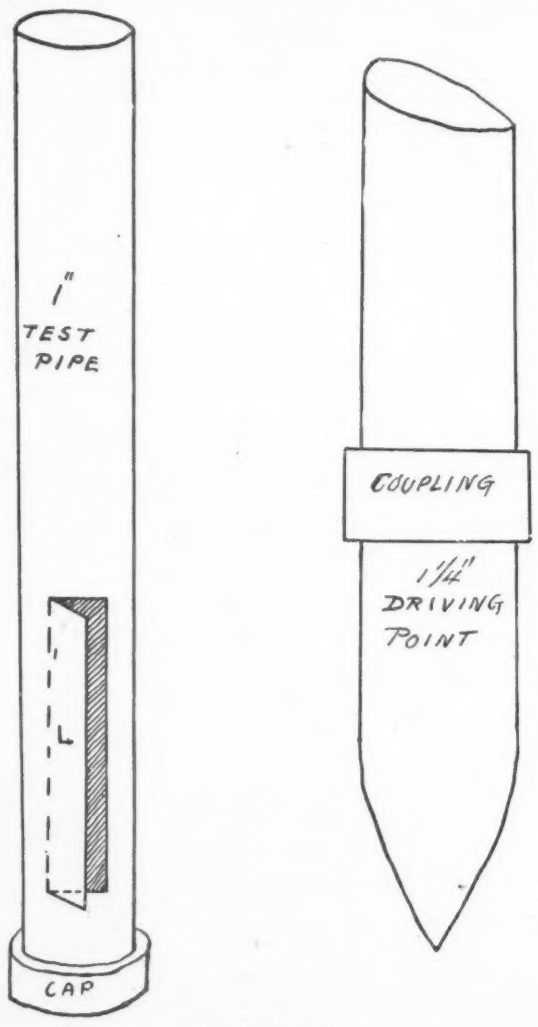
Wrinkle No. 14.

a convenient gas fixture, and the flattened end inserted between the bars of the firepot. To use it, fill the stove up with anthracite coal without the addition of any kindling or charcoal. Light the Bunsen and insert it between the bars of the firepot. This makes a very convenient form for kindling coal fires in a stove or grate in the fall, or at any time that they may have gone out. The fire can be lighted without smutting up the mica and without the annoyance of having to provide kindling, etc.

No. 15.—*Testing for Foundations.*—A simple and inexpensive way of ascertaining the material and depth of each stratum from the surface of the ground, to a depth of about 25 feet or lower, when it is of a soft nature, is shown in Fig. 15, and is the contribution of Mr. J. A. Mayers, of New York City.

Attach a driving point to a 1¼-inch pipe and drive this pipe vertically into the ground, coupling on sections of 8 or 10 feet at a time. Then withdraw this pipe by the aid of a wooden horse, as a fulcrum, and

chain attached to the lever and pipe. Then take out samples of the stratum every foot down, beginning a few feet below the surface, by

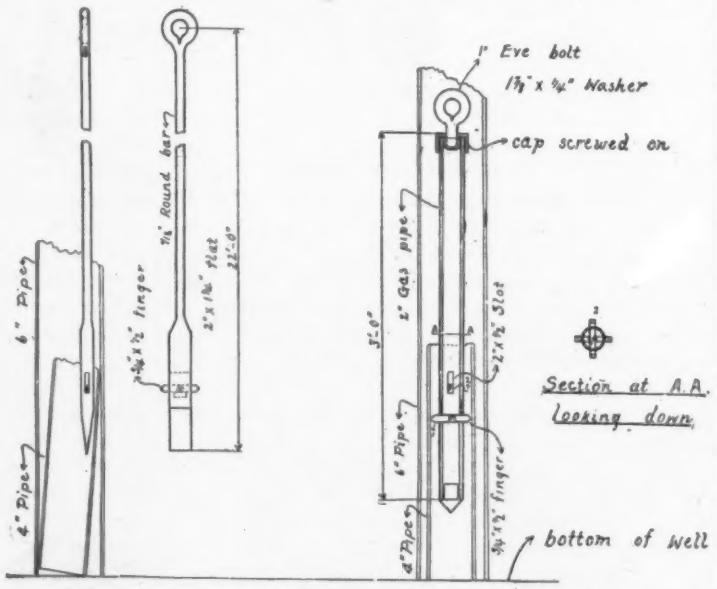


Wrinkle No. 15.

lowering a pipe a size smaller—in this case a 1-inch pipe, with a rectangular opening cut near the bottom of the pipe on three sides only. The piece still attached to the pipe is made to project to form a lip (L). When the pipe is turned around the lip scrapes from the point at which it is turned a sample of the material at that point. The testing point (1-inch) should be lowered or raised without rotation.

No. 16.—*Hoisting Pipe from Wells.*—"This device may be useful to works having water supplied by a deep well of their own," writes Mr. David Buck, of Phoenixville, Pa.

Fig. No. 16 shows a device which was used to lift two sections of 4-

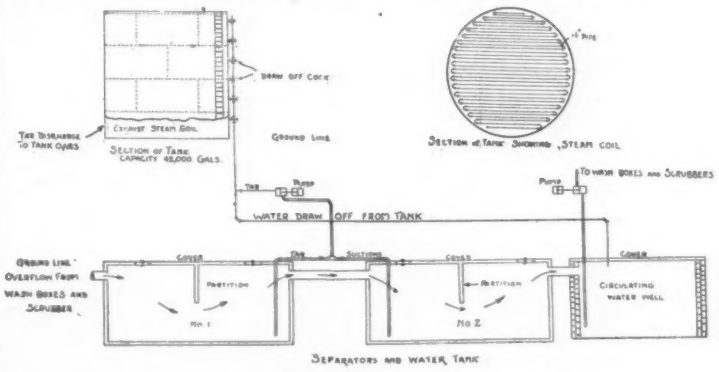


Instruments for Hoisting Sections of Pipe from Bottom of Bored Wells.

Wrinkle No. 16.

inch gas pipe, three lengths of pipe to each section, which, through the breaking of a chain, had fallen to the bottom of a 6-inch bored well, 190 feet deep. A piece of 2-inch gas pipe was taken and two slots 2 by ½-inch cut straight through, one above the other and at right angles, and steel fingers Nos. 1 and 2 inserted, which work on a pin or shaft. In lowering this, the sharp point will lead into the pipe, and the fingers, working loosely on the joint, will slide along the side or wall of the pipe; but when pulling back the fingers straighten out and pierce the sides of the pipe, which can thus be drawn to the surface. The cut to the left shows a similar device taking hold of pipe which was crushed in the earth at the side of the well through the force of the second section falling on it and partly closing the end, but by using flat and drawing same to sharp point the work was accomplished.

No. 17.—*Method of Separating Water from Water Gas Tar.*—This valuable wrinkle, shown in illustration No. 17, is furnished by Mr. Howard E. Mann, of Cleveland, O. The emulsion of tar and water from wash-boxes and scrubbers enters separator No. 1 at the top, passes down and under the partition, and into separator No. 2. The tar settles at the bottom of the separators, and the water passing on into the brick tank is pumped again into the scrubbers and wash-boxes. The tar is pumped from separators to the settling tank where it is heated by a steam coil in the bottom of the tank. The exhausts from pumps furnish steam for coil. As the water separates from the tar it is drawn off into circu-



Wrinkle No. 17.

lating tanks by the system of cocks and piping shown on side of tank. The temperature of the emulsion of tar and water in the separators is about 160° F. This causes the tar to settle rapidly, and the water in circulating well, 150° F., is entirely free from tar or oil. After heating the tar in settling tank the final separation takes place, and tar containing less than 1 per cent. of water is drawn from the bottom of the tank. Another advantage gained is the continued use of the separated water, no fresh water being used.

No. 18.—*Office Complaint Slip.*—Mr. B. F. Perkins, of South Bend, Ind., uses the slip shown in the table. When a complaint or order is received at the office a pencil line is drawn through the proper items. A carbon copy is made at the same time, for reference, and a list of the work done by the fitter is made on the back of the ticket, which is signed by the customer.

No. A.

Name.....
Street.....
Repair stove.....
Leak .....
Poor light .....
Take statement... .....Test meter.....
Set stove.....
Set meter.....
Remove stove.....
Remove meter.....
Water in service .....Frost.....Naphthaline ... .
Hang fixtures .....Estimate No.....
Service .....
Inspection .....
Mantle..... .....Chimney.....
Transfer meter to.....
Fitting.....Estimate No.....
Welsbach put up.....
Collect deposit..... .....Charge.....C.O.D.
Do work.....
.....
Approved for credit { .....
.....
.....
.....
Fitter sign here .....

(Front.)

SOUTH BEND, IND., ...1902.

.....

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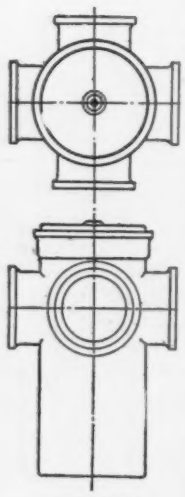
Customer sign here.....

(Back.)

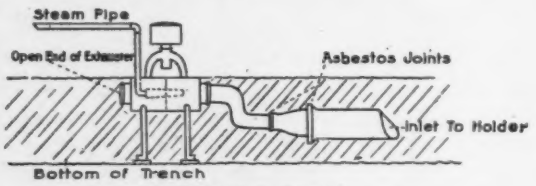
No. 19.—*Combination Cross and Drip-Pot.*—Mr. Jno. H. Fitzgerald, of Houston, Tex., would like to know why it is not feasible to make a drip-pot with four bells instead of two, as shown in Fig. 19. This would prove a saving in both labor and material when a drip is located at the intersection of two pipe lines.



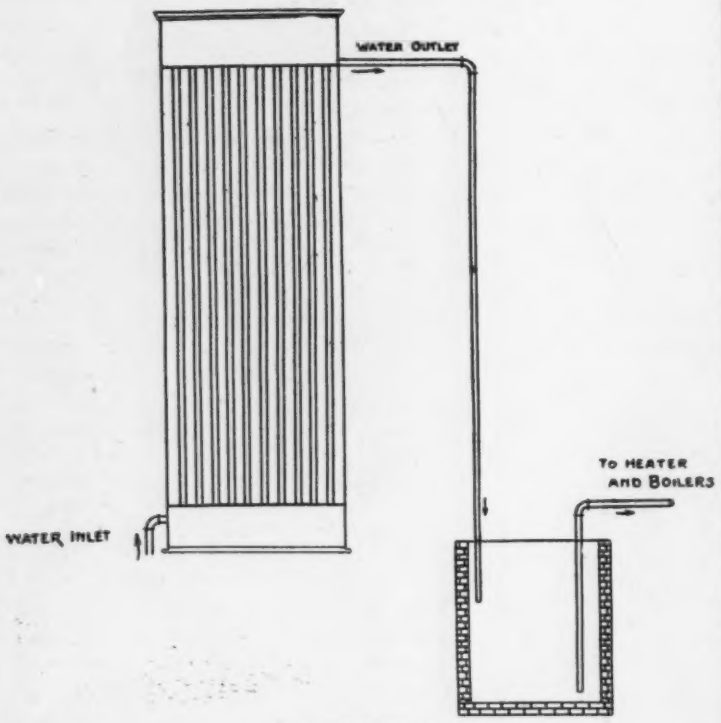
Wrinkle No. 19.

No. 20.—*Testing a New Holder.*—Mr. Jas. T. Pullen, of Alton, Ills., sends in sketch No. 20 an illustration of a simple and cheap means of filling a new holder for testing when first erected. He says: "When our new holder was completed it occurred to us to try filling it with air with an old steam jet exhauster, placed in the trench and connected up to the inlet of holder, as shown. In this way we were enabled to raise the lifts in a few hours, thus giving the erectors a chance to paint the sheets from the runway as the holder went up, as well as test for leaks in the crown."

No. 21.—*Method of Utilizing Condenser Water in Boilers.*—The water enters condenser at bottom,



Wrinkle No. 20.



Wrinkle No. 21.

as shown in Fig. 21, passes up through condenser tubes and overflows at top into brick well. The gas is cooled to between 90° and 95° F. at condenser outlet, and the heat absorbed by the water raises temperature of water at overflow to 150° F. The water collected in well is pumped through an exhaust steam heater into the boilers, at a temperature of about 200° F. This system, combined with the recovery of water from the water gas tar, reduces the total water used in boilers, condenser, scrubbers, and wash-boxes, to the metered water used in condenser.

Discussion.

The President—Gentlemen, you have heard the reading of a very valuable and unique collection of wrinkles which are now before you for discussion, either serially or collectively.

Mr. Somerville—Mr. President, a word about this gas safety seal. We had better not depend upon any seal, but look carefully at the gauges as usual. The next one, about cold water for scrubbing. A word of caution here. There must be a difference of 25° between the water and air; say the water is at 35° or 40° it then meets a stream of gas at 70°. No doubt the cold water will take more ammonia, some 700 volumes I think at such a temperature, but I contend such a fall of temperature will also take from the gas valuable hydrocarbons, and will produce naphthaline in the inlet or outlet of the holder; such at least has been my experience.

Mr. T. D. Miller—In an experience I had with stopped standpipes, in desperation one of the negroes got on top and poured about a half a pint of dead oil in the pipe that absolutely nothing could be gotten through. Before he could get down the tar, oil and stuff had gone through, leaving a free passage for a fire to be built in the pipe. After that if we had dead oil around the works we used it. In the drip tank shown by Mr. Goodnow I see he uses baffle plates. I do not see the occasion for such use. In fact, I think they are very undesirable. The resistance of the tank will be increased. The area of the tank being so much greater than the pipe the velocity is reduced and there will be ample time for the condensation to drop before it gets through. You want just as little friction in your mains as possible. I should leave out the baffle plates entirely. The wrinkle relating to complaint slips, where a variety of complaints such as are coming into the office are printed on the slip, resembles slips similar to those in use in New Orleans, and I found having a printed item on it for the character of the complaint to be checked off and handed out to the fitter was very undesirable, because the complaint clerk gets into the habit of doing his work in a most perfunctory way, and the fitter starts out without knowing the slightest thing about what he is going to have to do The clerk checks off "poor pressure" or "burner," something of the kind, and the fitter doesn't know what he is out for at all. We have changed all that. Our complaint slips are absolutely blank, and the complaint clerk is required to write out as fully as possible the information he can get from the consumer who comes in to make a complaint, so when the complaint man starts out he has all the information that it is possible to have up to that time in regard to that complaint. We use one of these recording, copying, duplicating machines, made by a concern in Niagara Falls; a blank sheet and a printed sheet, with a carbon sheet between which makes a duplicate at one writing. They are not thrown around on the desk, nor is there any chance to lose the consecutive numbers. When the complaint slip is torn off, the duplicate is torn off with it and filed, so as to keep the complaint men checked up and know that they are promptly returning their work. Then these slips after they come back are indexed by their numbers. We use two indexes. One is an index for the consumer, the other for the locality. The number on the slip is all that shows on the index. The locality index will show if we get a series of complaints from certain localities, or the other will show if we get a series of complaints from the same consumer. In that way I expect to get a great deal of benefit from the information that will be filed. This wrinkle relating to raising a holder with air pressure states that one of the objects therefor is to give the holder builder a chance to paint the holder. I don't think it is a very good practice to attempt to paint a holder immediately after it has come out of the water, unless it was rising very, very slowly.

Mr. J. H. Fitzgerald—In regard to drip described in Wrinkle No. 8, I will say that I have used a similar drip for the past 5 or 6 years. The connections are not exactly the same, as we make them in the way most convenient for the location; but the drip is satisfactory and I consider it a good thing and deserving of consideration.

Mr. R. M. Searle—In regard to the service drip pot I would say that the reason it is always placed outside of the cellar is that we thought if we put it in the cellar there was a chance of its freezing and bursting with disastrous results. During the winter we took six of these and filled them with water to make the test for bursting, and also filled six No. 11 Eclipse Gas Stove Company's furnace water heaters. All the drip pots as shown in the wrinkle burst, while none of the furnace water heaters burst. This shows that these water heaters make good service drip pots and could be used safely in a celler. We will use

these furnace water heaters as a drip pot in the future; however, the pump pipe should be brought out of doors. A large number of complaints of leaks we received during winter a year ago, turned out to be drip water spilled from small service drips in the cellar, and many of these "leaks" we were called upon to remedy two or three times, whereas if the pump pipe had been out of doors we would have had no complaint or dissatisfaction on the part of the consumer.

Mr. Mitchell—Referring to No. 14—Bunsen for lighting fires—I would say we have followed that method largely. The writer says fill the stove up with anthracite coal; I say, use coke in stoves.

Mr. Fitzgerald—Replying to the point brought out by Mr. Somerville in regard to Wrinkle No. 4, I would like to say that putting water 25° colder than the atmosphere into the final washer does not throw out naphthaline, because we have already passed the gas through a multitubular condenser that is cooled to the same temperature as the water in the washer, and all naphthaline that will drop is taken out in the condenser.

Mr. W. E. Hartman—I wish to indorse the second wrinkle, that of burning out stopped pipes with the aid of a forced draft induced by means of a steam jet in the pipe. We at Norfolk, Va., have also used this method of cleaning stopped pipes, and I can heartily recommend it to anyone having any trouble with standpipe stoppages. Previous to using this method, we reamed each pipe from the bottom every 4 hours and from the top every 24 hours with large reamers. Whenever we could not force the reamer through, we would burn out the pipe with a wood fire in the mouthpiece. This would take about 4 hours, and sometimes as much as 8 hours. Now using this method, we ream each pipe every 4 hours only from the bottom, with a large, short-handled reamer, and once in 3 weeks on the average we burn out each pipe by this steam-jet method. This takes 20 minutes and cleans the pipe so thoroughly that it runs 3 weeks before requiring cleaning out again. We have felt so gratified over the success of this ready method of taking care of standpipes that we wish to recommend it to others.

Mr. Steinwedell—I would like to say in reference to the wrinkle for drip separator, by Mr. Goodnow, that the separator has a very large area, and the gas going through at a high pressure, one would find by putting a pressure gauge on the outlet ends of the separator that there was no drop in pressure with baffle-plates any more than without baffle-plaets. Certainly it gives the gas a little longer course in going through the separator and it will deposit more water.

Mr. Goodnow—I have been asked for a little more information about condensation products in this drip where we think we catch nearly all the condensation. We found with coal gas, which we have been making exclusively for the last two or three months, that we separated at this drip about a gallon of oily matter to 12,000 or 15,000 feet of coal gas and about as much more of what is apparently nearly clear water. It may run 1 gallon of water to about 10,000 feet of gas compressed. Three or four of these samples of oil have a gravity of about 31, a little heavier than gas oil. These samples are now in the hands of the chemist of the Milwaukee Gas Light Company for analysis, and we hope to get a little information as to the distilling points and other features of this condensation.

Mr. Miller—I would like to ask what is the size of the pipe you are compressing that gas through?

Mr. Goodnow—Four inches.

Mr. Miller—What is the quantity of gas compressed through it?

Mr. Goodnow—About 10,000 to 15,000 feet per hour.

Mr. Miller—Its velocity in the pipe is not very great, then?

Mr. Goodnow—No; not very great.

On motion, Editor Steinwedell was voted hearty thanks for his trouble and labor in the matter of putting together the budget of wrinkles presented.

Next in order was the paper on

HEAT CONDUCTIVITY OF GAS RETORTS,

by Mr. H. A. Wheeler, of St. Louis; Mr. Wheeler not being present the paper was read by the Secretary as follows:

The Problem.—The problem is to determine if different makes of gas retorts have different rates of transmitting heat, and if so, to what is this difference due; *i. e.*, whether to the clays employed or to the difference in making up the retorts as far as this could be determined in hand samples.

The Samples.—Samples were furnished by four manufacturers, who are respectively designated, *W*, *X*, *Y* and *Z*. The request was made to furnish fragments from retorts that represented (a), the normal burn; (b) an overburn; and (c) an underburn. With one exception there was no appreciable difference in the samples furnished from a normal burn, which is intentionally made soft, to enable the retort to withstand the violent changes in temperature it has to endure in charging.

The samples furnished were trimmed down to 6½ by 8½ inches, except *W*, of which only one sample was furnished, and it was 4 inches by 8 inches. This undersize was very unfortunate, as it prevented direct comparisons being made with the other samples, though its value could be approximated by correction.

Sample *W* is convex, and, therefore, from the sides or top of the retort. The body is white, rather tender, porous, and soft burned. It contains considerable "grog," perhaps 30 per cent. or so, which is coarse, and consists of mostly pre-burned clay with some coarse quartz sand. The inside is glazed with a transparent film of glass (to reduce gas leakage).

Sample *X* comprised four specimens that were all well burned, strong, brown colored, and contained perhaps, 25 per cent. or so "grog." The grog consisted of pre-burned clay, and was rather fine, except in No. 1, in which it was very coarse.

Samples Nos. 1, 2 and 3 were flat or from the bottom of the retort, while No. 4 was convex, or from the sides or top.

Samples *Y* consisted of three specimens that were all flat or from the bottom, and were very similar in texture. The body was white, very tender, porous, and soft burned. The percentage of grog was very heavy, perhaps 50 per cent. or so; rather coarse, and mainly consisted of pre-burned clay, with some coarse quartz sand. The inside was smeared with a brown slip (to reduce gas leakage).

Samples *Z* consisted of three specimens, two being flat and one convex. They were similar in texture, having a slightly brownish color, rather porous, rather strong, and fairly well burned.

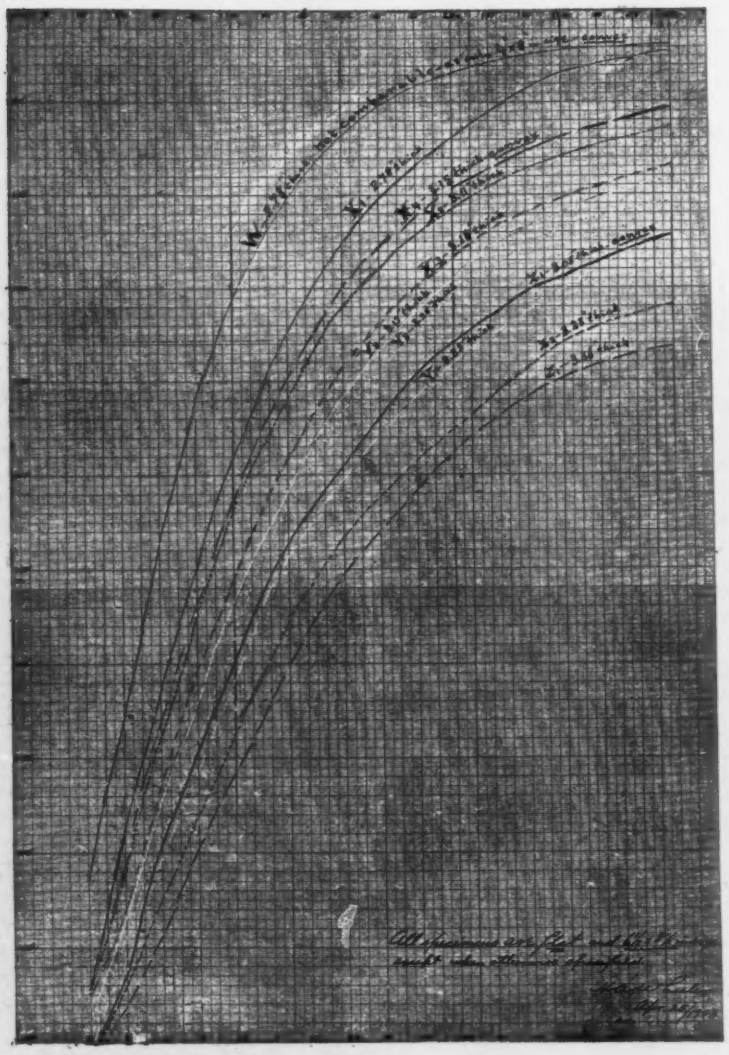
The samples not only differed in thickness, but were found to vary $\frac{8}{100}$-inch to $\frac{10}{100}$-inch in thickness, as determined by calipers, in different portions of the same specimen, and the thickness subsequently given was the average at the place tested. As gas retorts are poor conductors of heat, the thickness is a very important factor, as increase in thickness produces an increase in the resistance to heat transmission. While this is a theoretical premise, the diagram illustrates that it is well borne out in actual results.

The samples that were *convex* give somewhat better results than *flat* samples of the same material. This is due to a slight concentration of the heat produced by the convexity, and a similar benefit would be obtained in actual practice. There were sufficient flat specimens, however, to obtain satisfactory comparisons of the different samples, without having to consider this slight benefit due to convex shape.

Method of Testing.—After considerable experimenting to determine a method that would correspond as nearly as possible to the working conditions, and which could be so controlled as to give uniform conditions, the following method was employed:

A small, rectangular brick furnace was built that was 7¼ inches high, 8½ inches deep, and 6 inches wide, in the clear. The side walls were 4 inches thick, and ¼-inch thick asbestos boarding was used for the front and back walls. The specimen was set across the top of this furnace, leaving a 1-inch by 6-inch slot each side for the escape of the gases. The under side of the specimen was heated to a bright red heat by a special Bunsen gas burner placed in the furnace, and the temperature of the top or opposite side was taken every 10 minutes with a high grade thermometer (Green), the bulb of which was covered with steel filings to insure a good contact. The entire top of the specimen, including the thermometer, was covered with 8 thicknesses of heavy asbestos cloth, which aggregated 1¼ inches in thickness, to prevent radiation. A double shield of white asbestos board, set on the stem of the burner, to reflect the heat back on to the specimen, and the furnace was kept continuously hot. With these conditions duplicates checked satisfactorily.

The temperature was read every 10 minutes from the time the specimen was set on top of the furnace until it had nearly attained its maximum temperature. Starting with a temperature of 74° to 82° F., it was found that the increase in heat shown by the thermometer, or the rate of transmission through the specimen, with the underside at a bright red heat (or about 1,400° F.), was *very slow* for the first 10 minutes, in fact, *no increase* with the *Z* series; was less slow for the next 10 to 15 minutes; and after 20 to 25 minutes, the increase in heat or the *rate of transmission*, was *very uniform and regular* in every case for about an hour thereafter. This rate of increase practically follows a straight line, or a tangent to the hyperbola in the diagrams shown on the accompanying chart. This chart gives the entire information as to the time heated and temperatures obtained, in which the ordinates or *vertical* ranges are the *temperatures*, and the abscissa or horizontal ranges are the *times*. From thence the *rate* of transmission was less rapid as the top became hotter, until in three hours' time the top has become



nearly as hot as it could be made by this outfit, and the curve became nearly flat. The curve became quite flat or horizontal, after the other tangent of the hyperbola had been reached, when the heat was continued for about an hour longer or about four hours in all; but this is not shown in the chart, as the *differential rate* of *transmission* of the heat was already clearly shown in the first two hours. For as the specimens all start at nearly the same temperature, it required about 1½ hours heating to develop and bring out the respective heat conductivity rates of each specimen, which is the information sought, and which the curves of each specimen down in the chart clearly show.

Discussion of the Results.—A study of the curves of each specimen shown on the chart shows a marked difference in the heat conductivity rates of each group or make of samples, as well as between different specimens from the same manufacturer. (Each group or make is shown by a different color.)

The sample *W*, of which only one specimen was furnished, must be eliminated in the comparisons with the others, as it was about 50 per cent. narrower or smaller than the others, and hence would *heat up very much quicker* for the same amount of heat.

By experimenting on a similar narrow specimen of one of the other samples, it was found to increase its heat conductivity rate in about the same ratio as its volume was diminished. By correcting from this basis, and again correcting for its convexity and thickness, it seems probable that *W* sample would be equivalent, if flat and of the same thickness, as specimen *Y* 3, and this *W* sample need not be further discussed.

Before considering the individual rate of heat conductivity of each clay, there are other physical factors entering into the problem that should be considered, as these will affect the different specimens from the same clay or factory. These physical factors are: *Thickness, specific gravity, porosity, grog* and *shape*, and their value in the specimens tested is shown in the following table:

Table of Physical Factors.

Specimen.	Thickness. Inch.	Specific Gravity.	Absorption in 24 Hrs. Per Cent.	Hardness.	Grog.	Shape.
1-X....	2.78	2.43	8.3	6	Low	Flat
2-X....	3.11	2.42	8.5	5	"	"
3-X....	3.19	2.41	8.0	5	"	"
4-X....	3.15	2.37	7.3	5	"	Convex
....	....	....	....	....	....	....
1-Y....	3.35	2.27	13.7	3	Very large	Flat
2-Y....	3.17	2.30	13.6	3	"	"
3-Y....	3.25	2.30	13.6	3	"	"
....	....	....	....	....	....	....
1-Z....	3.36	2.41	10.6	4½	Very large	Flat
2-Z ..	3.23	2.36	11.2	4	"	"
3-Z....	3.04	2.35	10.7	3½	"	Convex
....	....	....	....	....	....	....
W.....	2.78	2.26	11.9	4	Large	Convex

Thickness.—The factor of thickness is very important, as is well shown in Nos. 1, 2 and 3 of the *X* series, in which the other physical factors are so nearly alike as to make these an excellent comparison of its value. For the same reason, Nos. 1, 2 and 3 of the *Y* series clearly show its bearing and value. The results of all the tests made show that the heat conductivity rate varies inversely as the thickness; or the *thinner* the *retort* the *more rapidly it will work off its charge.* Of course, there is a limit in practically applying this, as the breakage will become too great if made too thin, and it will require intelligently directed experience to determine how thin a retort can be made to withstand ordinary usage in order to increase its efficiency. A decrease of 10 to 15 per cent. in thickness, at least in such strong clays as *X* and possibly *Z*, could probably be safely made, and thus improve their gas making value 10 to 15 per cent.

Specific Gravity.—As a broad rule in physics, an increase in specific gravity increases the thermal rate of conductivity. A study of the data, in which there is only a moderate variation in the specific gravity, does not show any marked bearing, and as this factor also reappears in the individuality of the clay itself, it will not be further discussed.

Porosity.—Another general rule in physics is that increase in porosity decreases the thermal gradient. The measure of this porosity is best obtained by the increase in weight resulting from soaking in water. After testing the absorption by soaking in water from 1 hour to 5 days, it was found that if the dried sample was soaked 24 hours it gave satisfactory results as regards its porosity. As the porosity decreases the harder retorts are burned (and would be entirely eliminated if vitrified like glass), and as the hardness increases the harder a clay is burned, the hardness (as measured by Moh's scale of hardness, in which soft clay is 1 and the diamond is 10), was also determined to estimate the burning, and, consequently, to a considerable extent, the porosity.

While a study of the data shows that the *X* series, which have decidedly the least porosity as measured by the low absorption and high hardness, are decidedly more efficient; still this factor as a whole shows only a small influence, and the data at hand is too meager to estimate its value. Like the specific gravity, this factor will more strongly show in the clay itself and its treatment, so it will not be further discussed.

Influence of Grog.—The grog or non-shrinking material that is used in the body to reduce shrinkage and prevent cracking in drying and burning, and to also enable the retort to withstand the violent changes in temperature in charging, was found to vary greatly in kind and amount in the samples submitted. While the data indicates that an increase in grog decreases the heat conductivity, this is a matter that cannot be discussed from lack of infermation that the manufacturers decline to furnish. It is best considered in the individuality of the retort, as each maker has his own ideas as to the quantity of grog required to produce the best retort.

Shape.—A convex shape increases the thermal gradient, as shown by the tests and as indicated by theory; but as enough flat or similar types were sent to make satisfactory comparisons, this will not be further considered, as the bottoms are always made flat and the sides and tops convex.

Heat Conductivity of Different Reports.—After allowing for the influence of the previous factors as far as possible, the data shows that each of the three different makes of retorts, under the same conditions, have a relative efficiency of about as follows: 100: 110 to 120: 130 to 150, or the *X* to *Y* to *Z*. These values are approximate, as the material was insufficient to arrive at more exact results. But it is also quite likely that different retorts, as made on different days in the same factory from presumably the same material, will show quite as much variation in their efficiency, owing to the conditions under which they are made.

Resume.—The three samples submitted show that there is a variation of 10 to 50 per cent. in the efficiency or heat conductivity rate of these three different makes when of the same thickness; that thickness is a very important factor, and the efficiency of all retorts as heat conductors will be proportionately increased as the retorts are made thinner. How far this reducing the thickness to improve the efficiency can be safely carried will have to be determined by intelligent experience

Discussion.

The President—Gentlemen, I regret very much that Mr. Wheeler is not here to answer any questions that might be asked him. However, this topic has interested me for several years, because I have observed very great differences in retorts, not only as to makes but as to different retorts from the same maker, and I induced Mr. Miller to take it up thinking that the retort makers would join me in giving him any assistance necessary in the way of furnishing samples of different degrees of burning and what not. After a good deal of effort, I was only able to obtain three samples, which accounts for the sparseness of Mr. Wheeler's experience and his comments on this very interesting topic at this time, when we are all looking out for economy. If we could get a retort with an increased conductivity of 50 per cent. over that which we ordinarily get, I think the carbonizing effects would be materially reduced. I think it is time that gas engineers would make specifications like they would for other things, and would only accept what they want, not remaining satisfied with anything that the retort makers seemed willing to send to them. The only specification that I am aware of now that you prepare is providing for a retort that won't break when it falls off a railroad train. That seems to be the principal thing. I would like to have the paper discussed in a general way.

Mr. Thwing—The writer spoke about the porosity of retorts affecting their thermal efficiency and conductivity. It is undoubtedly true that any porous material is a non-conductor of heat or cold, but Mr. Bredel in a remark he made to me developed a point (which he seemed to be unwilling to make at the present time) that in practice retorts in a short time become saturated with carbon. We all know retorts become much denser after being in use for a short time, and that the heats on the retorts become better, so that probably a series of experiments like these would not be of as great value as a series of experiments upon portions of retorts which had been in use for a certain length of time. It is necessary to have retorts porous, as I understand. I have been brought up to understand that a considerable amount of burned material has to be used in them in order to make them refractory. I am of the opinion that the writer has made the amount of grog (as he calls it) or burned material too low, although I don't know the proportions of the manufacturers. I think that probably 50 per cent. of the retorts in our gas works consist of burned material, and my experience has also been that the more burned material that is included in retorts the better the retorts are. It is more refractory to heat and less liable to crack. So it seems to me we cannot avoid this porosity in the new retorts, but that it is overcome later on by the accumulation of carbon from the gas that is made in the retorts while they are being used in the benches. This paper is very interesting and valuable, and I am of the opinion the experiments should be carried further. The conclusion that the author reaches that there is a difference of 50 per cent. between the conductivity of different retorts (I believe he says different retorts of the same maker) is very surprising indeed to me. I do not understand, simply for the reason in the nature of the work that a retort has to do its conductivity is added to, that it removes any necessity for improving the initial conductivity. If you could improve the initial conductivity of this retort 50 per cent., then add your graphite or carbon as an additional conductor, you would have still a 50 per cent. better retort. I cannot see the power of the argument.

The next number was the paper on

MUNICIPAL OWNERSHIP OF PUBLIC UTILITIES,

by Mr. A. E. Boardman, of Brevard, N. C. Mr. Boardman being absent in Europe, at the request of the President Mr. T. D. Miller read the paper as follows:

In requesting a paper on municipal ownership of gas works your Executive Committee has assigned a most difficult task. It is almost impossible to write anything new upon a topic which has created such universal interest and controversy as this. Hence a presentation of the arguments pro and con must at this late date be in the nature of a compilation rather than the introduction of original ideas.

Municipal ownership, not only of gas works but of water and electric works as well, is a subject of pressing importance to all urban communities, and considerations affecting the advantage or disadvantage of such a policy should be thoroughly understood by all. These considerations apply in a general way to any municipally owned and operated public utility, though with varying force. They may therefore be discussed under the general title of municipal ownership of public Utilities, rather than of gas works alone.

The tendency in this country is now, and has been increasing for some years, to try municipal ownership of all public utilities as a panacea for the ills and annoyances which the operation of such utilities inflicts upon the communities in which they are located, and the magazines and newspapers teem with articles advocating such a policy. Statements of the advantages to accrue to the public and arguments in favor of adopting it are the stock in trade of politicians seeking office, and public cupidity is stimulated by skillfully prepared statistics proving the vast profits to be derived therefrom.

Discussions on this subject have often reached an accrimonious stage, since the "point of view" is such a controlling factor. As arguments for and against the tariff appeal differently to producers than to consumers of protected articles, so stockholders do not look so favorably upon municipal ownership as those who have no interest but to pay the bills. It is contended that things which our civilization has advanced from mere conveniences or luxuries to necessities, and whose distribution or operation demands so large a portion of the public right of way, should be owned by the public so as to be absolutely under its control and management.

In the case of lighting plants it is contended that since the municipality is in its streets and public lighting often the largest customer, and since the comfort and safety of the people are so dependent upon the purity and light giving power of the article furnished, the control and regulation of such plants should be absolutely in the hands of the municipality.

Likewise, in the case of water works, since the health of the community is dependent upon the purity of the water furnished, its comfort and cleanliness so dependent upon the quantity furnished, its safety so dependent upon the pressure at all times available, and its public needs in its streets sprinkling, sewer flushing, fire protection, etc., are such large portions of a water works' functions, it is contended that the ownership and management should be in the municipality.

It is contended in the case of street railways that since so much of the streets is permanently occupied and used by them, the comfort and convenience of the public being so dependent upon their management, they also should be owned and operated by the municipality. They say that the municipality has in its police powers and police force greater ability to discover and correct shortcomings and abuses incident to corporate management and corporate greed. They insist that the profits derived from such undertakings, over and above the cost of operating them, should be devoted, first, to defraying the cost of the public service, and then to reducing the price to the consumers, so as to lower the cost of living and increase the number able to avail themselves of these utilities.

It must be admitted that theoretically these arguments are powerful, and to many minds convincing; but in the words of one of our country's greatest statesmen, "It is a condition and not a theory which confronts us."

Primarily, it cannot be too positively demanded by a free people that governmental activity should be restricted to purely governmental functions. To enlarge its sphere of activity is to enlarge the number of voters dependent upon those elected to the higher offices, and so the freedom of the ballot becomes restricted, and the power of parties increases at the expense of patriotism. In a free country capital and labor should have the largest possible scope for profitable employment, and wise competition should be encouraged for the purpose of cheapening the cost of production and perfecting methods and machines. When the government usurps any industrial enterprise, just so much is the field for profitable employment restricted and healthy competition destroyed. The vigorous growth of interested energy gives way to the dry rot of supine officialdom.

As very forcibly said by Mr. John A. Britton, of Oakland, Cal., before the Pacific Coast Gas Association in 1896: "The protection of capital and the protection of labor are duties of governmental bodies far above and beyond that of any other sphere in which they may work. The destruction of capital means the destruction of labor. The protection of capital means the protection of labor. One is as much dependent upon the other as the life of plants is dependent upon the sunshine." Any candid mind will concede that where the public confers upon a corporation extraordinary privileges, such as permanent rights of way in streets, the right of eminent domain, or franchises in a community, it is entitled to insist upon certain duties being performed, and also to exercise a supervision over the operations of such corporations as is necessary to enforce the performance of such duties. This does not mean the ownership and entire management of such operations. On the contrary, such ownership and management would defeat the very object of a wise, disinterested governmental supervision, as will be hereinafter shown.

A supervision, as above conceded to be reasonable, should be both wise and disinterested to properly fulfill its functions. It should be exercised by persons of discretion and knowledge in the industry under

consideration, and not subject to the influence of local feelings, often wrought up by irritating but purely local causes. Hence, the State and not the municipality affected should constitute the supervising board. That such a course is practical and efficient is abundantly and most satisfactorily proven by experience in the State of Massachusetts, whose Board of Gas and Electric Light Commissioners has done such excellent service both to the people and to the lighting industries of that State.

That municipalities have the power to enforce regulations affecting the purity and efficiency of their supplies, and are equipped with the machinery to promptly give information of, and to rectify, abuses is true; but these powers are seldom used to rectify abuses within itself except under pressure of public opinion. Since when have fellow servants in a household acquired the habit of informing upon each other's shortcomings to the common master? In what city, owning its lighting and water plants, is the public kept informed by the police of negligence in the lighting department, or by the firemen of lack of water or pressure in the water works' department? Where these utilities are owned and operated by private corporations it is universally the case that the slightest deviation from contract requirements is not only promptly reported, but also published; so that the authorities may not only act to rectify the trouble but that such action may be sustained by public opinion. The public servants act for the protection of the rights of the public, and so long as they stop short of unjust accusations and persecutions this state of things is right and in the interest of the whole community. As soon as the city acquires the utility plants all this is changed, It becomes the interest of the administration to hush up all complaints; for is not the administration responsible for the acts or negligence of any of its departments, and is not the charge of dereliction of duty in any of them a reflection upon the administration? Hence it is that in municipally owned works it takes a long time to rectify abuses, because it frequently requires a change in the administration before it can be effected. This is very difficult in any case, and is rendered still more difficult the greater the number of voters employed by the municipality.

In many places the citizens suffer without complaint or with only murmurs, because they feel the uselessness of complaining, and bear for months with a state of things they would not tolerate a week if the works were owned by private corporations. Take the city of Philadelphia, for instance. For years the citizens suffered from insufficient pressure in mains and poor quality in the gas, together with higher prices than charged in any other large city in the country. They made ineffectual efforts to improve the service, even by changing the administration, and making the gas supply an issue in several municipal campaigns. Finally, in desperation they parted with the control and management of their gas works to a private corporation, with very gratifying results to the community at large and with profit to the private corporation. So greatly improved is the service that a proposition to sell the works outright to a company has been seriously considered, and would doubtless carry if left to a vote of the gas-using public.

In the same city the people have suffered during a decade from a turbid and health-menacing water supply which they would not have tolerated if furnished by a private corporation for six months. And now, when forced by public opinion to adopt a system of filtration and purification, the authorities have selected a most expensive method both to construct and to operate, and the cost to the public will be double what it should be.

Observe the great city of New York. The mere matter of waste in its water supply has grown to such proportions that double the necessary amount is being distributed with consequent decrease in pressure and increase in cost. The people are asked to raise one hundred millions of dollars to increase the supply, when if owned and managed by a private corporation the object would be accomplished at an expense of ten millions of dollars by the use of well known methods, and in a manner not to work a hardship upon the people so far as their actual needs are concerned. In fact, a private corporation would not have permitted waste to grow to such proportions, and the pressing problem of the city would have long ago been solved.

The most appealing argument for municipal ownership is that of reducing prices to consumers and in getting the public supply free. This is based upon a fallacy, but the contention is difficult to disprove, because the accounts of municipalities owning public utilities are generally so involved that it would require weeks of expert accounting to properly classify the items of expense chargeable to the utility plants. Interest on the plant investment is one large item which is seldom considered. In this respect, and in this only, is the city at an advantage over a private corporation. It can generally borrow money at a lower rate, but this advantage is offset many times by wastefulness in municipal management. That municipal management is less economical than private management is a fact beyond dispute. That it should not be so may be admitted; that it *is* so *must* be admitted. It will hardly be gainsaid that any public work, even to street cleaning and sewer flushing, can be more thoroughly and economically done under private than under municipal management. Intelligent self-interest will compel the employment of tools and machines of highest efficiency, while only the necessary number of men will be employed and all of them will be required to give full value received for their wages. The city administration is chary about spending the people's money upon improved machinery, but lavish in expending it upon men who vote and can enhance the power and permanence of the said administration. This should not be so; but it is so, and cannot be changed, even by changing the party in power.

Hence it is that, no matter how alluring reports from municipally owned works may appear, the absolute cost to the community is greater than in a well managed private works. One convincing test may be applied to cities owning their public utility plants: Has such ownership resulted in decreasing the valuation placed upon property for taxation or in the tax rate? If not, either there is no real profit to the community, or there is gross extravagance in other departments.

Frequently the public is deceived by a lowering in the price to the actual consumer while the budget suffers to make up the deficit. In other instances the price to consumers is higher than in cities of similar class which are supplied by private corporations, and considerable profit is carried to other accounts. But since no charge is made on the books for interest on the investment the profit is only apparent. Low prices to consumers is by no means the rule in municipally owned works, and in trying to maintain them the authorities are frequently brought face to face with the alternative of increasing the price of the service or of the tax budget. At the time when the city of New York is considering the advisability of building its own gas plant, the city of Wheeling, W. Va., with the second largest municipal gas works in the country, is seriously considering how to avoid raising the price of gas to consumers; and this in close proximity to the coal fields.

The largest gas works in the world, furnishing gas at lowest prices to both public and private consumers, are owned and operated by private corporations. In England where the most thorough and exhaustive tests of the comparative advantages of the two systems have been made, the conclusion has been reached that municipal ownership is not so advantageous as private ownership under a wise governmental supervision--a supervision which protects the public against inferior service and yet assures to capital a security and remuneration far above anything of the kind in this country. If it were possible to induce our lawmakers to desist from senseless and often ruinous attacks upon legitimate investments in public utility plants, and to turn their attention to aiding both the public and investors in obtaining and supplying cheap products, on lines similar to those so efficacious in England, it would prove a blessing to all concerned.

The matter may be summed up by saying that municipal ownership of public utilities is safe and profitable only in that city whose streets are kept perfectly clean and in good condition; whose public buildings, parks and other city properties are kept in thorough order and repair; whose excise laws and all city ordinances are enforced without fear or favor; whose police and fire departments are conducted in the most efficient and honest manner; whose sanitary department is prompt and fearless; and whose finances are managed as economically and accurately as in its large business houses. Where there is room or need for improvements in any of these matters that city had best refrain from municipal ownership of public utility plants.

Discussion.

The President—Gentlemen, you have just heard this paper written by Mr. Boardman. It strikes me as one of the cleanest, clearest-cut statements of the municipal ownership question that I have heard. I would like to have it so discussed by the members as its importance demands.

Mr. Butterworth—I do not think municipal ownership of gas works is a very active movement just now in this country. I know of but one instance in this country where a municipality has taken over a gas works in the past 10 or 15 years—that of Holyoke, Mass. I would like to know if anybody here can tell us of any other case besides that, in the last 10 years.

The President—Not probably an accomplished fact but they are threatening it.

Mr. Butterworth—They are talking about it, but I think the question of electric street lighting is more thought of in this connection, possibly

because the public seem to think that gas is a back number. People don't think so much about the municipal ownership of gas works as of electric lighting plants. I think the gist of Mr. Boardman's paper is in the last paragraph, where he says that the only cities that can with any degree of consistency undertake to conduct a lighting plant are those in which all the other branches of their city governments are already being perfectly administered. I often think of a conversation that my former associate, Mr. Lathrop, and I had one day with a certain leading gentleman of the city of Columbus, O., who was advocating municipal ownership. He is a sort of politician, a large manufacturer, a man of large affairs in that community. We went to him to call him down a bit; to have a little private talk with him. We said, "The city is not doing well in the business it is now undertaking to do; why should you talk of taking on these other difficult and technical matters, under sueh circumstances? Look at our water works. Our city water is notoriously unfit to drink. Look at our streets; they are dirty and full of holes. The work the city is now undertaking to do is very poorly done, yet you talk of taking on more! Do you expect the city to do any better with gas works and electric light works than with its water works?" He said, "Well, I admit they are pretty bad; but when we give the city officials and our governing bodies more responsibilities they will rise to them." We said, "Do you do that way in your own manufacturing establishment? When you find an employee who does his work poorly, do you promote him, so that he may rise to the added responsibility?" He said: "No; he promoted the competent men and discharged the incompetent men." In this connection I often think of the parable wherein certain men were charged with certain responsibilities and given certain opportunities, to which some of them rose more or less successfully, and the successful man, who had made most of his opportunities, was told, "Well done, good and faithful servant, thou hath been faithful over a few things, I will make thee ruler over many things; enter thou into the joy of thy Lord." Suppose the Master had said to the man who had made a failure, "Badly done, incompetent and unreliable servant; thou hast been unfaithful over a few things, I will make thee ruler over many things!" How inconsistent and unjust that would have been! And yet that is exactly what the advocates of municipal ownership are saying to American cities to-day.

Mr Enright—I can hardly agree with the writer of this paper on the idea of municipal ownership growing in popularity; for, as a matter of fact, as far as my experience and observation go, it has been declining and gradually growing into disfavor with a very large class of the intelligent, honest, thinking people during the past year. Now, as an illustration, I wish to call your attention to what happened at Kansas City about 6 months ago, at which time the people of that city were called upon to vote on a proposition to bond themselves for $400,000, to be used in the construction of a municipal electric light plant. The election came off in due time, and to the very great surprise of those who favored the measure, they woke up the next morning and found themselves overwhelmingly defeated. And you, no doubt, would like to know how this result was accomplished. As soon as this scheme was laid before the people of that city, the Kansas City *Star* sent forth an able corps of reporters, and those men ran down the exact condition of every municipal plant within a radius of 200 miles of that town, and their reports showed, which included taxation, cost of street lighting, as compared with what they formerly paid to private companies, their increase in taxation as well as their great loss in commercial lighting wherever it was undertaken. In one instance they clearly demonstrated where 95 per cent. of the community were being taxed to make up the loss of current sold at much less than cost to owners of palatial homes, large hotels and business houses of the place, and such plain, matter-of-fact data appeared daily in the *Star* during the campaign and was backed up by very able and convincing editorials. This work will enable you to see the great power and influence wielded by an honest, able and conscientious newspaper, one that has the interests of its community at heart and the moral courage to defend them. And should such a man live in your town, all that is necessary for you to do is to show him the fallacy of this doctrine and you will find him and his paper opposing such undertakings. Strange as it may seem, about two-thirds of the time devoted to this subject in almost every case is taken up by the question of ownership of public utilities and the many great advantages derived therefrom, where, as a matter of fact, there is very little in the ownership of any property; for instance, a little child could own this magnificent hotel or the great Pennsylvania Railway system, and as long as the properties remained in the hands of the present or some equally good management, they would be successful. So do not throw away your time combating the question of ownership, for in doing so you generally succeed in bringing down a mountain of prejudice upon your heads. It is far better to devote your time to showing the taxpayers, the people who contain public justice in their makeup, and those who have a desire to be honest with themselves as well as the community in which they live, that, owing to our form of municipal government, it is almost impossible for a municipality to manage properties of this kind in the interests of the people—that, on the contrary, it will be to their detriment. You can also quote a legion of cities and towns in our country where this scheme has failed that will successfully back up your statements. Also, clearly show them that "what is everybody's business is nobody's business." Do not fail to try to convince the great industrial class, those who own the many little homes in your city, that it is a great mistake for them to mortgage their property to carry on political schemes of this kind, for if they do their property is very liable to be taxed, in case commercial lighting is done, to make up the loss in lighting the homes of the wealthy, while they sit by a gas light, coal-oil lamp or candle which they pay for themselves. In conclusion, I desire to state that our experience in this line within the past 4 years has covered almost every phase of this question, and I should like to relate it from its introduction in our towns, having the city as a competitor, their efforts to force us out of the field (and, by the way, let me state that as a general proposition a municipality as a competitor in the lighting business is a snap as compared with a well handled plant owned by private parties), our legal contests with them, not to mention the many amusing things that have happened. However, the all-important thing for a community to learn is to be honest with themselves, to conduct their public affairs on the same principles that are always applied to private undertakings. This, I am free to admit, is very seldom done by municipalities; but wherever you find a citizen who believes in that sort of public management, you will also find a man who is willing to encourage capital as well as work for the welfare of his town and people. Such a man is intelligent enough to be honest with himself, and I would rather have 100 such men than 4,000 who did not know enough to be honest with themselves or the city they call their home.

Mr. Berkley—In the discussion of this subject I desire to call your attention to a case of municipal ownership that shows the usual efficiency attendant upon such business relations between the municipality and the people. In the State of Ohio there existed an artificial gas plant. Natural gas being discovered private parties engaged in the business, after which some of the city officials incubated the idea of municipal ownership and cheap gas. Things went smoothly until the gas began to fail, and when nature failed the city authorities' resources failed. However, a young lawyer at the time saw the opportunity where money was being lost; he saw that two shares of stock could be made to grow where before one or less grew. His proposition was finally accepted, and from junk, including lines in size from 12 to 2-inch, which were of no use to the system where taken up, and together with the surplus of other good or better material purchased by the city were sold for a large sum of money. Subsequent sales of junk reduced the cost of the plant to almost nothing, as $150,000 was the purchase price as compared with an expenditure of nearly 1 million. Natural gas has so decreased that we are now installing for the present owners an artificial works with a capacity of three-quarter millions daily, thus we have a fair sample of the management by municipal ownership. I think the last sentence of the paper by Mr. Somerville could be incorporated in this discussion with much profit, for to that class of exuberant gaseous gas men belong the responsibility of helping to hatch out municipal ownership, through the incubator of a city council. Tinhorn politicans and political ward heelers who are easily caught by such statements, as we get 11,000 to 11,500 cubic feet of gas, current price $1.25, 1,400 to 1,500 pounds of coke and tar and amonia enough to make such a showing that, when compared with the cost of one ton of coal at market price, the gas company is at once cited as a monopoly and robbing the citizens. Young men of the profession, use consideration, moderation and correct statements. If you are getting such grand results let the balance side of your ledger keep silent sentry on your achievements.

Mr. Harbison—I have listened with much attention and care to the paper and discussion on this matter of municipal ownership. Much has been thought of and written in connection with it. It is a sort of fad or craze that is going around the country, this idea of municipal ownership. In our city of Hartford we have a very large amount of talk, gush and nonsense brought forth on the subject of municipal ownership. Our State (Connecticut) has five or six, so called, labor representative Mayors of its principal cities, and they are all, of course, interested in this question of municipal ownership. The Mayors have quarterly meetings in which they sit together and talk about it, and dine and wine at the expense of the resident Mayor, and municipal

ownership gets quite a boom at these meetings. We have attempted legislation on the subject, and they, of course, were in favor of it. Much has been said in regard to the press and its influence and all that sort of thing, but the press generally is fair minded and honorable, and desires to have the right thing laid before its constituents. The readers are its constituents, and I have failed to find a paper (that was not of the yellow journal style) that was not willing and glad to get reliable data and information on this subject. They have no wish to mislead the public, they cannot afford to do so, and the duty of every gas man is to see that every item of information that comes to him on this subject, that is truthful and reliable, is conveyed to the editor of the paper or papers in his immediate vicinity. Lay the matter before the editor, and leave it on his honor and duty as to what he shall do regarding it. The results will not be disappointing to you. I speak with some knowledge of the situation. In our city of Hartford, of 82,000 people, at the present time we have a Mayor, coming from behind the counter in a ready made clothing establishment, to be Mayor of a city at $3,000 a year at one jump, a bright man, deeply interested in the so-called labor element experiment, and, of course, imbued clear through with the value of municipal ownership, the value of public utilities for the city of Hartford, and in season and out of season, day and night since his elec tion, he has been devoting much time to that subject, appearing before committees and organizations, reading papers to business men of the city on that subject, and immediately after finishing his reading taking his hat and coat and leaving the room apparently afraid of being asked questions. A committee of the Common Council was appointed last year on this subject, who subsequently reported unanimously against the feasibility of it. That report was laid on the table near the close of the old Council year, and taken up immediately after the new Council came in, when its further consideration was indefinitely postponed. That will be the result which each one of you will experience if you will take hold of it right. Put a word of good advice and good counsel in the ears of the committee; he may be waiting on you to get facts, that they want to know. To begin with we have a law on the statute books of our State which says that any town or city, before they can go into the business of supplying gas, must first treat with the old company, buy out its property and carry that on. So the esteemed Mayor and supporters, in order to arrive at municipal ownership, must buy out the existing gas works. The gas companies have nothing to do but to say, we will accept; then name their price. If the city is not willing to accept it the law provides that a commission shall be appointed by the courts, of three disinterested parties, and they to make an award that the city is bound to pay, and now in one city they are trying to show that the law is unconstitutional, and they will not be compelled to take the burden. They are in a bad fix. This municipal ownership business; what will they do with it, if they get it? Tell me a city in this country where there is a man competent to manage a gas works except the men that are engaged in the business already. I tell you, gentlemen, there is a whole lot of truth right in there. Of the thousands of men in the city where you live the only one competent to carry on the business you are carrying on is yourself personally, and they all know it. What can they do? They cannot afford a man from the next town; they cannot get him, he is needed there. That is our experience in trying to get good help. Municipal ownership can be killed if the gas managers manage that feature of it judiciously, with good common sense. Treat your customers well, give them good service as they are entitled to, as you are accustomed to do, maintain your good reputation, and how can they better themselves? The people that own stock in your gas companies are not coming in to throw away their investments and increase their taxes for municipal ownership, which will carry with it increased expenditures beyond those now in force; and it cannot be otherwise. Politicians get hold and control, and they will get hold and control, and we know what that means in any city where matters are run politically. There is no greater field for politicians to enter if they can but get towns that have the management and control of the gas industry. We have it within our hands to hold on to it, and so carry on our business that no power can take it from us or will be willing to, and we have done our duty to our own reputation, and to those who are stockholders in our enterprise, and to the people whom we serve. (Applause.)

Mr. D. McDonald—There was once a very successful man in New York named Jay Gould, and there was once a movement on Wall street, when a reporter came to him and said, "Mr. Gould, do you think this movement can be stemmed?" He said, "My friend, I never attempt to stem any currents. I simply find out which way they are going and either make them go my way or go with them." If there is in the United States a popular current in this connection, the gas men cannot resist it. In fact we can exercise less than our ordinary influence as citizens because whatever we do will be supposed to come from interested motives. I think we can, however, so shape matters that if the city insists on having a gas plant they will pay a fair price to those who are stockholders for it. Mr. Boardman's excellent paper points the way. If the cities of this country do not get hold of the gas business until they have thoroughly mastered the sewer business, and the murder business (by that I mean punishment of murder), and keeping streets clean, when they get that highly educated, the public conscience will also be educated up to a point where they will either be unwilling to touch the gas works, or else will be willing to pay a fair price for it. The courts, both State and national, stand against property being taken for public purposes without compensation, and in cases that are left to a commissioner of a court as to what property is worth, as a general proposition the private owner does not get the worst of it as against the public.

Report of Committee on World's Fair Exhibition.

The President—We are ready now to receive the report of the Committee on World's Fair Exhibition.

Mr. Miller—Mr. President, this Fair Committee consisted of Mr. Chollar as Chairman, myself and Mr. Mitchell. I have not had any consultation with either Mr. Mitchell or Mr. Chollar. I don't believe Mr. Mitchell has done anything. I know I have not, and Mr. Chollar says he has not. I think, however, we are right at the point where if any sort of action is going to be taken or Exhibition given it should be put into shape now. The management of the affairs of the Association seems to be pretty much in the hands of the President; it might be put in such shape that the President can take such action as the case seems to demand.

The President—Gentlemen, you have heard the report of the Committee, which indicates that it will be proper to have a resolution placing this matter entirely in the hands of the incoming President, or in his discretion.

Mr. D. McDonald—I have the greatest confidence in our President, but it seems to me for the Association to say they will place this matter in the hands entirely of the President, and be bound by whatever he does, without confining anything, how much money is to be spent, or if any is to be spent, or even learning what is to be done, looks to me a bad precedent.

Mr. Shelton—Perhaps I can best answer that by giving an idea of what little has taken shape in a small degree in the discussion of this subject in so far as I have been able to gather it. I will try to do it briefly. I am more or less responsible as President—at least I will be—next year for what the Western Association does at the St. Louis Exposition. You know these expositions always raise great big questions. There was a great amount of experience accumulated in that question in regard to the Chicago Exposition. As to the Association taking any part or trying to make an exhibit, there seem to be insuperable obstacles; that is, to do it successfully. It means a great amount of labor and a great amount of knowledge on the part of someone, trying to line up different interests together; it means the expenditure of a very large amount of money. It means something which was a failure to successfully put through at the Chicago Exposition in 1893. The unanimous sentiment, as far as I have been able to ascertain, is that it will be a mistake and unnecessary for this Association to try to make an exhibit, unless it be an historical exhibit, at the St. Louis Exposition. If any movement of that kind should arise it should naturally come from people who have goods to show; it is not the province of an Association. This fact, however, was suggested: The St. Louis Exposition is peculiarly a mid-country enterprise. It is in the great central territory that this Association covers. This Association has elected to go there the coming year. It can most appropriately act as host to such visiting gas men as may come to the Exposition, no matter what Association they come from—the New England, the Pacific or any other Association. The Western can stand at the center of the Mississippi Valley and extend its hand of welcome in any shape it may see fit, extend facilities for comfort, have a point where gas men can gather. It would be a nice thing for the Western Association to stand sponsor for and to do. It would not take a large amount of money to arrange for headquarters within the grounds if feasible, or without the grounds if necessary—in the grounds preferably, a sort of gas men's club, you might say, for 6 months, in the city of St. Louis. The expense involved in that would not be so great; possibly the larger gas and supply companies might come in and raise a little money without involving this Association in any Association action or levying an assessment. It is just as much my duty as President to see that the Association is not unduly put to expense, as any other duty I have to perform that year. The tendency

seems to be to try (if possible by local committee that may be appointed) to provide a modest headquarters for visiting gas men, under the auspices of the Western Association. On that line I would like your authority to work. I don't know that it is possible (there are a great many questions arise at once), but I think it would be a nice thing to do, and a number of people with whom I have spoken seem to agree that it would be a desirable thing. If it is the sentiment of this Association that the President try to go forward on those lines with such a committee, those will be the lines on which I would expect to work, without undertaking any trade exhibit feature, without undertaking any expense feature of any kind for this Association. That committee would have to be part local and part up-and-down the valley, and I would suggest that the appointment of that committee be left to the incoming President That is as far as anything I have been able to take up looking ahead to next year.

Mr. D. McDonald—The suggestion Mr. Shelton makes is the best one I have heard, but as far as I am concerned I do not think the end will justify the means, especially if the means are that the supply men shall be expected to put up some money to entertain us. I move that it is the sense of this Association that we take no action at all as to the St. Louis Exposition.

Mr. Harbison—I hope my friend's motion will not prevail.

Mr. D. McDonald—It has not received a second.

Mr. Harbison I will second it for the sake of seeing it fail.

Mr. D. McDonald—I withdraw the motion.

Mr. Harbison—Mr. President and Gentlemen, I believe in what the President-elect has said. We are an industry and we have a pretty decided competitor in the electric light industry, and they will not spare time or money to make an exhibit at St. Louis that will boom their business. I do not think it necessary for this Association to appropriate money, to go to any expense to amount to anything for the purpose of having an exhibit of gas appliances in the city of St. Louis at that great fair we are looking forward to; but I do think it is due to ourselves, to our profession and the industry that it should not be a back number. A committee with the President and his associates would see that space was provided, and that those who are in the manufacturing of appliances connected with the use of illuminating gas have a place in which to exhibit their wares and show what can be done, and that is what we all want to have done in St. Louis, where every man, woman and child that can, from all over the country, will visit to see what there is there on exhibition, and see what advancement has been made in various lines. I think the gas industry ought not to be a back number, and with the energy and push of our President-elect and such associates as he may call into counsel with him, they will be able to get an exhibition there that will be of great credit and advantage to our industry, and without expense to the Western Gas Association. Every manufacturer of gas appliances will only be too glad to get space there in which to show his wares and prove that they are the best made in the world, and so will his competitors. We ought to give them the opportunity, and hope the resolution that the President and such associates as he may call in with him should co-operate to that end, and yet without burdening this Association with money expense, will prevail. I hope, therefore, that authority will be given the President, and that we shall expect of him, as we always look for, excellent results in work that he undertakes, and we have a good right to from what he has done, and that this will not be an exception to his previous history.

The President—Those in favor of adopting the report of the committee will make it known by saying aye. [The motion was carried.]

At the request of Mr. F. H. Shelton, the following paper, written by him on

QUADRUPLING THE CAPACITY OF AN ORDINARY PURIFIER HOUSE AT VERY SMALL COST,

was taken as read:

Small companies are often confronted with the question of the need of considerable increase of purifier capacity, in conjunction with but a small amount of money with which to enlarge. I suggest the following method as a simple and effective procedure. It is based on the very satisfactory use of concrete for making home-made boxes at half of the usual cost, as recently done by the New Orleans Lighting Company, in a set of 4 purifiers, 25 feet square by 7 feet deep each, and described by me in a paper[1] entitled, "Current Purifier Practice, and a New Form of Construction," read before this Association at its meeting in May last.

A purifier box is, after all, but a rectangular vessel to hold lime or oxide. A vessel that is outgrown needs to be replaced by a larger vessel. The method herewith proposed is that of using the purifying house or cellar itself as as vessel for holding, preferably oxide. The scheme can best be shown by describing the arrangement at Petersburg, Va., where I am now carrying it out. Sketch No. 1 shows the existing purifiers 55 feet by 10 feet each by 3 feet deep, with the usual center seal and connections, inclosed in a room 26 feet 4 inches wide by 32 feet 2 inches long. The cellar is 8 feet deep from floor to floor, and there is comfortable (19 feet) headroom to the roof trusses. The arrangement is representative of sources of small purifying houses. The 4 boxes proper together have a cubic capacity of 600 feet; the capacity of the cellar space from floor to floor level is 6,656 cubic feet, or 11⅛ times that of the boxes. It will readily be seen that if the cellar is made into the holding vessel how great a gain of purifying space can be secured.

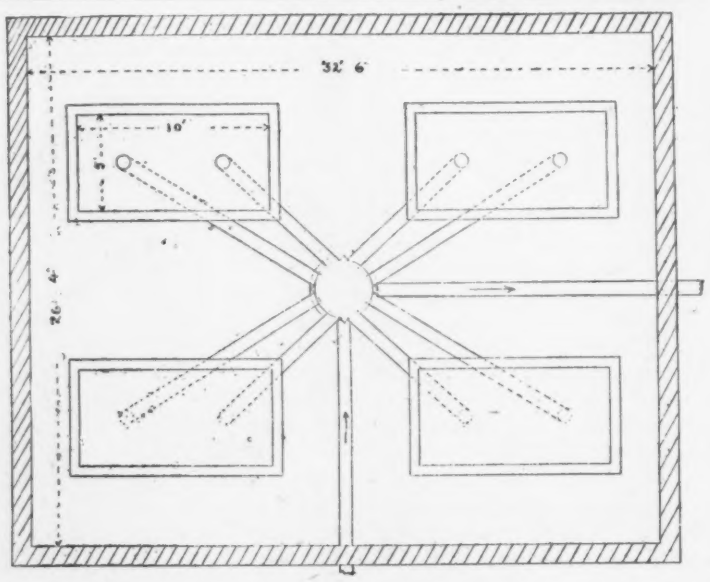
Sketch No. 2 shows the plan underway. The walls are lined with concrete a few inches thick to make them perfectly water tight, and to give a smooth interior surface and to take up the irregularities of the stone work. Expanded metal is imbedded in this concrete to bond everything together. The cellar floor is filled in and levelled off in the same manner with about a foot of concrete, leaving a 7-foot space to the main floor line. The concrete floor should be not quite level but should drain to one corner, at which point a 4-inch tar pipe connection should be supplied. Across the building two walls, *AA*, are run from floor to floor between which about 6 feet space is left for pipe connections. Further walls, *BB*, are constructed to subdivide, the result being 4 boxes, each 12 feet wide by 12 feet long by 7 feet deep. These boxes with concrete walls properly made will be found entirely water tight and probably gas tight. If any doubt exists on the latter point the walls can be further treated by a coating of hot paraffine, applied on the inside to fill the pores. These boxes are fitted with tee iron tray, bearing bars at convenient levels for carrying 2 deep beds of oxide. These tee irons are carried on small cast iron brackets that are bolted to and through the walls. The gas enters between the two beds of oxide, one-half of the stream passing up and the other half passing down, the two streams uniting in a collecting take-off pipe located against the walls, *AA*. The covers are of the dry-lute pattern, made of ¼-inch wrought iron plate, stiffened with 3-inch angle iron, riveted all around the under edge and by 3 tee irons riveted across the top. The gas tight joint is made by a 1¼-inch rubber buggy-tire, cemented to the under side, around the four edges of each cover. When the lid is lowered, this rubber rests on a 6-inch channel iron imbedded in the concrete walls and forming the top and wearing edge of the box. At intervals of about 20 inches all around this angle iron, upright 1-inch bolts project, that are imbedded in the cement and carry swivel cams or dogs for locking by a wedge action and holding down the covers. When the lid is to be raised, the cams are all freed by turning a quarter circle and the cover can be hoisted clear. The covers are lifted from the old I beams overhead used for the original covers. The valve connections controlling the supply to each box are conveniently located and handled between the walls *A A*, and this space is floored over above, with any kind of open wood slat or iron plate flooring that is desired. When everything is closed down, and the boxes are in use, the floor lids and the flooring between the walls *A A* form, practically, a level floor over the area of the whole room, and at the same level as the old floor and the ground level outside. In cases where the old floor is 3 or 4 feet above the ground level, the new floor would work out to the same level, and the cellar floor or box bottoms would be that much nearer the ground level, and all the better.

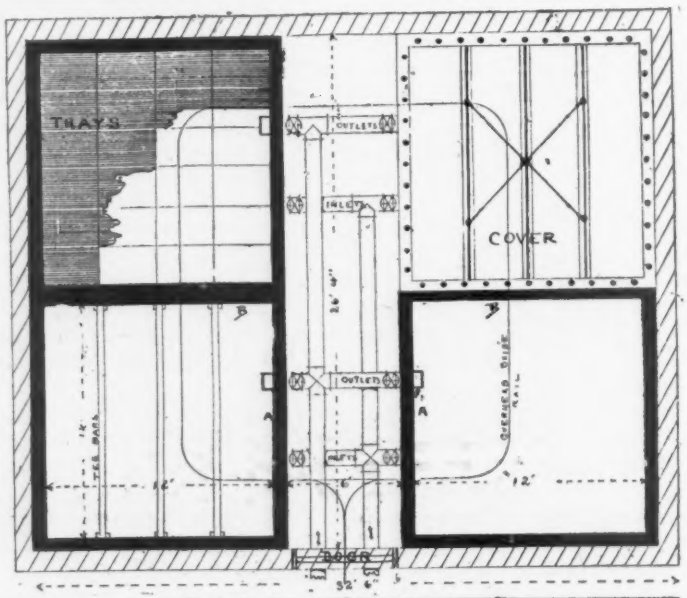
When a box is to be opened, the lid is hoisted a foot or so, and pushed along out of the way, over an adjoining box. It is proposed to remove the oxide by having a large wrought iron dumping bucket carried on an overhead light track or rail (shown by the light line) extending over all of the boxes and running outside to any desired point, for dumping the oxide. This bucket, holding several bushels, will be carried on a light chain block and fall, so that when filled at the bottom of the 7-foot box, it can easily be hoisted up 7 or 8 feet for clearing the box, and then be pushed out on the overhead trolley rail.

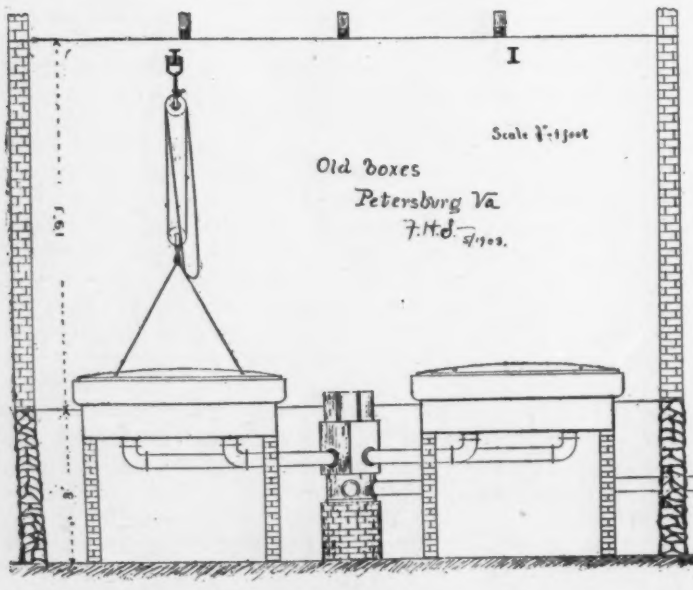
At Petersburg the result of above is cubic space for purifying about 6¾ times greater than in the old boxes. It would be an exceptional case that did not result in at least three or four times more capacity. Moreover, as the gas is subdivided into several streams, and each stream in turn is subdivided into halves passing through each layer of oxide in each box, the rate of flow is desirably very slow, the proportionate area of surface and time of contact being greatly increased.

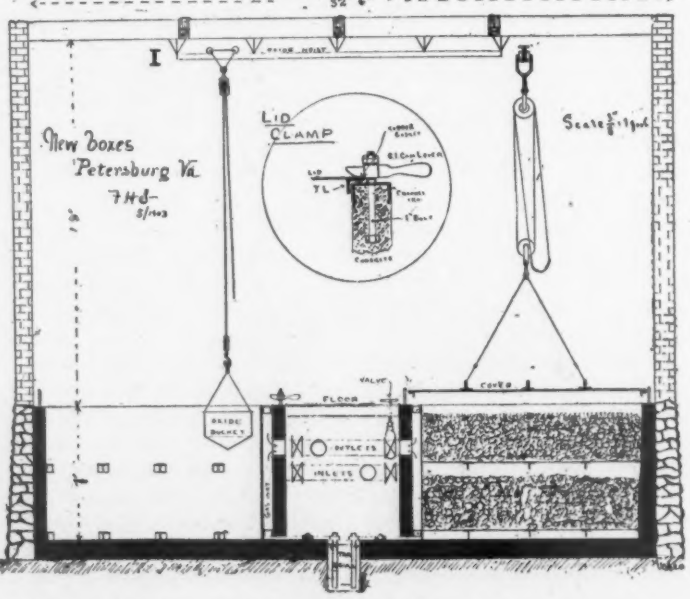
The plan permits of the use of the existing house without any change whatever; it disarranges nothing on the premises; involves no more yard room and but little change of general pipe connections; it utilizes the old beams and hoists of the cover lifts; it does away with water seals, rusted purifier sides and blowing cups. The work, moreover, can be done comparatively easy by the company itself, with a little care,

1. See JOURNAL, June 9, 1902; p. 851.









enabling much quicker completion than the usual delivery from shops at a distance, where a good deal of iron work is involved and the cost is undoubtedly much less than that for which the same results and capacity could be secured if new purifiers of the usual form be contracted for.

In brief, is there any reason in many cases why the purifier house itself should not be made water tight, and be used as the oxide holding vessel, giving enormous increase of capacity in a simple and inexpensive manner? In some cases no doubt one half of the purifier room fitted in the above manner would give enough new capacity, leaving the other half for convenient use for oxide, by flooring over with a course of brick grouted in cement.

On motion, a unanimous rising vote of thanks was tendered Mr. Shelton for preparing the paper.

THE QUESTION BOX.

The Secretary reported that the Question Box held only the following inquiry:

> "What is the best plan for reviving a man overcome by artificial gas; and what is the best treatment for one partially overcome?"

A Member—Plunge them in cold water containing plenty of hartshorn.

Mr. Miller—I have gone into that thing pretty extensively. Talking with our physician over the subject, his idea of the best thing to do is to bring about respiration by artificial means. Throw the patient on his back, raise his shoulders so the head will fall back and give free passage to the air; pull the arms back, then down on the chest and press hard, with about the rythm of breathing, until respiration is restored. As soon as respiration is about normal again, the heart action not yet being normal, a very good thing is to let the sufferer inhale a little nitrate of amyl, which distends the blood vessels, giving them a chance to pass more freely through the veins and arteries. Immediately on placing a rag saturated with nitrate of amyl in front of the patient's nose, almost instantly (or in a few seconds) the patient will be suffused, the blood will be seen flowing more freely. If they have inhaled too much carbon monoxide they will die; there is absolutely no way to eliminate it if it is is in too large a dose. The blood is so fixed that the red corpusles cannot give up their oxygen, and the blue corpusles, or the ones charged with carbonic acid, cannot give up the carbonic acid and take the oxygen again. I know of a case, one out of three or four recorded, in which the patient did not die within a few hours. He lived 13 days before death ensued, and on the fourth or fifth day a spectroscopic analysis of the blood showed carbon monoxide still therein.

Mr. John D. McIlhenny—This question is especially asked with reference to water gas. I would say in the University of Pennsylvania a few years ago, some very careful tests were made, particularly upon animals, to find out by what means restoration could be effected. It was conclusively shown that if in sufficient time fresh blood could be supplied to the patient (in other words, by transfusion of fresh blood) the patient would recover. In fact, the result of the researches was to show that in no other way could the patient be restored from poisoning by carbon monoxide except by transfusion. They made quite a number of tests on dogs, and in every case in which fresh blood was supplied, before the sufferer had gotten beyond a certain stage, it recovered.

Mr. D. McDonald—There are not many service gangs that carry along appliances for the operation of transfusion of blood, and not even many of them are armed with nitrate of amyl, but you will find that certain doctors will tell you to take a man into the open air and walk him up and down, while others will tell you that will kill him, advising instead to lay the affected one down and keep him where it is warm. Others will say give him whisky. Others will say give him a little coffee. Now, there are three or four treatments, all of which I have known to be applied, which are founded on directly contrary principles. It is a pretty important matter that we should not only know this thing, but know it in a way to have it handy at the time, and I am going to move that the incoming President appoint at his leisure a committee to look into this matter, and to have printed in card form complete direc-

tions by which workmen can restore one another where that is possible, and whatever information can be added beyond that, if that should be impossible. If a man keels over in a ditch there is no time to make any transfusion of blood, to administer pure oxygen or nitrate of amyl. You have to do semething right there and then.

Mr. Doty recommended the use of oxygen, and described how it should be administered. [Mr. Doty's remarks on the matter were quite amplified; but even at this date—June 30—he has not returned the sheets of his speech that were forwarded him.]

Mr. Perkins—I want to verify what Mr. Doty says about the use of oxygen. We have used it in many cases and have had complete recoveries in a short time. As I understand it, a man might die from carbon monoxide blood poisoning due to lack of circulation caused by the carbon monoxide changing the shape of the blood corpuscles so that they cannot flow or circulate. As Mr. Doty says, treatment has to be applied for the aeration of the blood through the lungs. Anything administered through the stomach is both useless and dangerous.

Mr. D. McDonald—As a matter of fact I found two doctors in our own city, one of whom actually administered a certain treatment that the other doctor said it was a great wonder did not kill the man. Now, the truth is somewhere, and it is not hard to find the most portable and applied remedy. The remedy to send to the hospital where there is a tank of oxygen, of course, is probably best, but there are many small towns where there is no hospital and where there would be no tank of oxygen.

Mr. Harbison—If we go on with this discussion providing for these remedies, it will be set down that the gas managers are a set of highway murderers. That we are to set up a drug store in our wagons, build hospitals, hire physicians to take care of those who are injured, I think is all unnecessary, in our experience, and we have had our share of it; we have had many people working for us whom I knew had inhaled too much gas. My experience is that the wisest thing to do is to have in your wagon under the care of your foreman, whether at mains or service pipes, a nice little bag of juicy apples or a dozen lemons, and before a man goes to tap a gas pipe give him an apple or a lemon and send him over by the fence to eat it. You will not have a man overcome next year by using just that little precaution. That is our personal experience repeated many, many times, and we have never killed a man, and we don't have a corps of physicians on the pay roll, and we are not supporting the hospitals to take care of our patients. We have also given them some good strong coffee and bathed their heads in plenty of cold water. If my plan is followed there will be no trouble from illuminating gas which they will inhale, they won't inhale much of it. I think it is the duty of every manager in these days to use every precaution in advance. If I have a large service pipe to tap, and we don't tap less than 1¼-inch hole in any pipe, I put in a stopper each side of the work to shut off the flow of gas. It is a very inexpensive matter, and there are stoppers that are very effectual.

Mr. D. McDonald—This question has brought out the information which it was desired to bring out, and if apples and lemons are really the best things, I would like to have official approval of the Association on the apple-and-lemon idea. Therefore, I want to renew my motion that a committee be appointed to investigate this and print the findings in card form so as to be posted for ready reference.

[Motion seconded and adopted.]

Mr. Gimper—We had a man overcome last November while making a 6 and 8-inch connection. Two gas bags gave way. We had no time, as Mr. Harbison suggested, to give the men apples and lemons to eat; but we sent for a doctor. The man had fallen into the ditch. We got him out promptly, got him into fresh air, fanning him till the docter came. The doctor found the patient's pulse low. The first thing he did was to give him a hypodermic injection of strychnine which revived his heart action and he soon was breathing stronger again. The man claimed to have suffered great injury. His shoulder was so lame he could not raise his arm. He also claimed his eyesight was injured so he had to wear glasses, one for near and the other for farsightedness; also, his chest was affected from the gas, and the X-ray machine showed dislocation of the shoulder, for all of which he only wanted $10,000, but he recovered very fast after a compromise was made with him. The hypodermic injection and fresh air were very beneficial in this case.

Votes of Thanks.

Mr. Shelton—I think before a motion to adjourn is put to reconvene to morrow, it is only proper that an expression of our appreciation and thanks be given to the men who have provided for our entertainment here, for all the courtesies extended to the members and friends of this convention held in Indianapolis. We have been beholden to them for a great many kindnesses, a great many courtesies, and for practically taking care of us. I think it would be extremely proper that this Association express its thorough appreciation of the work done by the Committee of Arrangements and by the local gentlemen of the Gas Company, and those who have participated in making arrangements for us. We know we have been well taken care of; we know that blemishes of service in a new hotel were not the fault of the local gas people, or by intent, but of conditions beyond their control. We appreciate the sincerity, the intent, the desire on the part of the local committee to give us the best they possibly could; they have done it, and I am sure we appreciate it, and I move that the Association take this occasion to express its thanks.

The motion being seconded was unanimously carried by a rising vote.

On motion of Mr. William McDonald the thanks of the Association were tendered, by a unanimous rising vote, to the President and Secretary of the Association for their careful, earnest work at the meeting.

A motion to declare the Convention adjourned was adopted.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. Samuel B. Hubbard, who organized the Citizens Gas Company, of Jacksonville, Fla., in 1876, and was its President at the time of his demise, died in his home at Jacksonville the morning of June 21st. He was in his 70th year, and had been prominent in everything that concerned Jacksonville for almost half a century.

A correspondent in Philadelphia, writing under date of June 27th, says: "It is interesting to note the very large installation of carburetted water gas plant in the United States this year, gas companies generally having been called upon to supply unusual demands for their product. The United Gas Improvement Company, of Philadelphia, the largest builder of Lowe water gas apparatus in the world, reports that its business so far this year has been phenominal; that it has under contract 51 sets of its Standard double-superheater Lowe water gas apparatus, aggregating a total daily capacity of about 55 millions cubic feet. When it is considered that the estimated annual sales of artificial gas in the United States are about 84 thousand millions cubic feet, or, an average of about 233 millions cubic feet each day, the year's installation of this Company alone, representing in capacity nearly one-quarter of the annual sales, indicates the position that carburetted water gas keeps in the artificial gas field. Water gas manufacture is not confined to any one locality in this country, as is shown by the following list of places in which the United Gas Improvement Company is building:

Rochester, N. Y.	Brooklyn, N. Y.
New York (Mutual Co.).	Hempstead, N. Y.
Baltimore, Md.	Waltham, Mass.
Chicago, Ills.	Chester, Pa.,
Dover, Del.	Lynn, Mass.
Amesbury, Mass.	Allentown, Pa.
Aberdeen, S. D.	Newark, N. J.
Savannah, Ga.	Winsted, Conn.
New York (Central Union Co.).	Chicago (Ogden Co.).
Canon City, Col.	Washington, D. C.
Cicero, Ills.	Boone, Ia.
Schnectady, N. Y.	Pueblo, Col.
Hagerstown, Md.	Charlotte, N. C.
Easton, Pa.	Malden, Mass.
Fall River, Mass.	Lawrence, Mass.
Council Bluffs, Ia.	Duluth, Minn.
Bridgeport, Conn.	Chattanooga, Tenn."
Albert Lea, Minn.	

The output of gas in Toronto, Can., has increased rapidly since the reduction in price from 90 to 80 cents per 1,000, and the Consumers Gas Company, of that handsome Canadian city, has again found it nesessary to add to its generating plant. A carburetted water gas set, up to a daily capacity of 1,000,000 cubic feet, is now being installed by the Economical Gas Apparatus Construction Company. This set is to be an exact duplicate of the one erected on the Consumers' works last fall by the same contractors. To manufacture and sell gas in Canada under present conditions at 80 cents per 1,000 cubic feet and have a fair profit requires the use of the most modern and efficient appliances, and the Toronto Company has installed within the past two years many labor-saving appliances and much up-to-date plant and machinery. The agitation for municipal ownership has died out since the reduction in the selling rate, and the citizens seemingly are satisfied with 80-cent gas, while the greatly increased output gives great satisfaction to the proprietors of the Company and to its astute, clever and well-beloved Manager and Secretary, Mr. W. H. Pearson.

The City Trustees of Corona, Cal., have granted a franchise for the right to there operate a gas plant to Mr. M. W. Findley.

Col. M. P. Wood, of New York, writing to us under date of the 27th ult., says: Dear Journal: In your issue of June 22d I note Mr. Runner's communication on cement joints, etc. His method of pipe jointing I think a very good one, but it would have been better had he made mention of the arrangements for expansion of or in the line. In Boston, and many other northern cities with a colder climate than that of Freeport, Ills., joints made in cement are found to be too inelastic when the line is so laid, particularly for pipes under 10 or 12 inches in diameter. It is customary to make 3 to 5 joints of lead, and 1 joint of lead in all curves or angles, specials, etc. Mr. Frederic Egner could, no doubt, contribute to this matter from his experience and from his many interviews with gas men who won't talk or write as well or as freely as friend E. My own experience with cement is that it is about as unreliable for pipe or much other underground work as possible for one to use. It in most cases depends on the brand of cement, the manufacturer, labor, time used after mixing, how mixed and used, and a number of other

conditions, the non-observance of one or more of which group causes a failure of the cement.

AT the annual meeting of the Gas Light Company, of Waverly, N.Y., Messrs. F. T. Page, F. A. Gillette and S. L. Gillette were elected Directors. No change, in fact, was made in the Company's executive management.

MR. CHAS. E. BARKER, of Coalinga, Fresno county, Cal., has applied to the authorities for the right to there construct and operate a gas and electric lighting plant. The Supervisors will consider the application on the 10th inst.

A CORRESPONDENT in Boston forwards the following: "The Adams (Mass.) Gas Light Company has issued circulars, the contents of which have been and are of much interest to the residents. Among other things the following speaks for itself: 'On and after July 1st the price of gas will be reduced from $2 to $1.80 and $1.60 respectively, for lighting, or mechanical purposes. A discount of 10 per cent. will be allowed on the prices on all bills paid at the Company's office on or before the 10th day of the month following the one for which the bill is rendered, making net prices of $1.62 and $1.44. Gas bills will be made every month beginning July 1st, the same as are the bills for electric light. No discount will be allowed after the 10th of each month when bills become due. Electricity will be charged at the rate of 15 cents per 1,000 watt-hours, with sliding scale for larger monthly consumption, from which a discount of 10 per cent. will be allowed, as indicated above. Further reductions in prices will be made whenever increase in business and decrease in cost of production will permit, but the above rates are lower than in many cases where the business largely exceeds that in Adams.'"

THE following notations concerning the new rules formulated by the Building Department of the Borough of Brooklyn, respecting future placing of gas pipes and gas fixtures in buildings, may be of interest: A permit must be obtained from the local building bureau before there can be any installation or alteration of gas piping in any building or part of a building. The permit will only be issued to a registered plumber and in connection with a permit for plumbing and drainage. The application for permit must include all floor plans complete, showing every outlet and the number of burners to go to each outlet. Small alterations may be made by notifying the Bureau of Buildings. Another rule provides that before any fixtures can be connected with the gas piping a permit must be obtained. There is provision for the quality of piping to be used and the weight per foot is specified according to size. A heavy brass "straightway" cock must be placed in the service pipe immediately inside of the front foundation wall. Iron cocks or valves will not be permitted. Wherever it is not impracticable all "risers" shall be left not more than (——) feet from the front wall. No pipe shall support any weight or strain whatsoever, except that of the fixtures attached. Piping is to be laid above not below the beams, and where lines or branches cross the timbers they must do so within 36 inches of the end of the beams and in no case are the pipes to be let into the timbers more than 2 inches. Piping shall not be laid in cement or concrete unless the pipe and channel are well covered with tar; nor shall they be laid within 6 inches of an electric wire, except where they join in outlets. Drops and outlets of less than three-fourths of an inch in diameter shall not be left more than 1 inch below plastering, center pieces or woodwork. Unions or running threads will not be permitted, and, where it is required to cut out to repair, the pipe shall be put together again with right and left couplings. Gas burners are to be not less than 3 feet below any ceiling or from any woodwork, unless protected by a shield and then not less than 18 inches. Folding or swinging brackets shall not be placed against any stud partition or woodwork. Gas brackets placed near windows where curtains are used shall be protected by shields. For gas ranges the outlets shall have a diameter not less than ½-inch and all gas ranges and heaters shall have astraightway cock on the service pipe. Brass piping shall be classed as fixtures. All brass tubing for arms or stems shall be at least of No. 18 standard gauge and full size outside so as to cut a full thread. All threads on brass pipe shall screw in at least $\frac{5}{8}$ of an inch. All rope or square tubing shall be brazed or soldered into fittings and distributors, or have a nipple brazed into the tubing. Cast fittings, such as cocks, swing joints, double centers, nozzles, etc., shall be extra heavy brass. The plugs of all cocks must be ground to a smooth and true surface for their entire length. They must have not less than ¾ of an inch bearing, except in cases of special design, have two flat sides on the end for the washer, and have two nuts instead of a tail screw. After all piping is fitted and fastened, and all outlets capped up, there must be applied by the plumber, in the presence of an inspector of the Bureau of Buildings, a test with air to a pressure equal to a column of mercury 6 inches in height, and the same to stand for 5 minutes; only mercury gauge shall be used. No piping shall be covered up, nor shall any fixture, gas, heater or range be connected thereto until a card showing the approval of this test has been issued by the Superintendent of Buildings. And, again, when all fixtures are hung, a similar test shall be applied in exactly the same manner, excepting that one burner fixture will be omitted to permit of applying a pump and gauge. On the inspector's report of this test as above, a final approval card in duplicate will be issued by the Superintendent of Buildings. No meter will be set by any gas company until a certificate is filed with it from the Bureau of Buildings, certifying that the gas pipes and fixtures comply with the foregoing rules. All buildings shall be piped according to the following scale:

Pipe	⅜	inch	26 feet	3	burners.
"	½	"	36 "	6	"
"	¾	"	60 "	20	"
"	1	"	80 "	35	"
"	1¼	"	110 "	60	"
"	1½	"	150 "	100	"
"	2	"	200 "	200	"
"	2½	"	300 "	300	"
"	3	"	450 "	450	"
"	3½	"	500 "	600	"
"	4	"	600 "	750	"

THE shareholders of the Menominee Electric Light, Railway and Power Company, the Menominee River Gas Company and the Marinette Gas, Electric Light and Street Railway Company, all of Wisconsin, have voted to consolidate.

THE properties of the Waukesha American Gas Company, and of the Waukesha Electric Light Company, of Waukesha, Wis., have been consolidated. The title of the amalgamated concern is that of the Waukesha Gas and Electric Company.

THE authorities of Port Clinton, O., have granted to E. F. McDowell the right to supply either natural or artificial gas in that place for a period of 10 years, from January 1, 1904. Not to exceed 45 cents per 1,000 cubic feet can be charged for natural gas, and not more than $1.10 for artificial gas. A certain amount of free gas is to be supplied to the town. Meters are to be charged for at the rate of from $3 for No. 2 to $4.50 for No. 5. At the end of 4 years the meters are to become the property of the consumers.

A Semet-Solvay Coke Plant at South Chicago.

The acquirement of 193 acres of land at South Chicago in the Calumet district, upon which, it is reported, will be constructed 120 retort coke ovens, has created considerable interest in industrial circles within the past few days. F. R. Hazard, of Syracuse, N. Y., who is said to represent a number of Eastern capitalists, has purchased the ground referred to. The land has been secured in three tracts. The first two tracts embrace 33 acres in the vicinity of 111th and 112th streets, on the Calumet river, the river forming the eastern boundary and Torrence avenue the western boundary; $217,250 was paid for this property. The principal tract, however, embraces the southeast quarter of section 13, extending from 110th street on the north to 114th street on the south, and from Torrence avenue on the west to Paxton avenue on the east, containing 161 acres, for which $220,000 was paid, making a total expenditure of $437,250 for the entire property. The land is admirably situated for shipment, either by rail or water. The Calumet Western, Chicago and Western, Indiana and the Chicago Junction Railroads are adjacent to the property, and the Nickel Plate Road bisects the principal tract from north to south.

It is understood that the Semet-Solvay Company will prepare the plans and supervise the construction of the coke ovens, and also will probably lease and operate the plant when completed. The estimated cost of the buildings, ovens, coal handling machinery and other equipment will be $1,500,000, making a total investment of $2,000,000.

The intention, it is claimed, is to dispose of fuel gas to the industries in the vicinity. The other by-products, tar and ammonia, will doubtless find a ready market. The plant is expected to be in operation in about a year from date. It is contemplated to construct additional ovens ultimately. The property secured by the coke interests is in the vicinity of the steel plant being erected by the International Harvester Company and the blast furnaces of the South Chicago Furnace Company.

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JULY 6, 1903.

The Market for Gas Securities.

The situation this week is to all intent as it was last, save that towards the close the general market showed more animation. The quarry that is neither lamb nor beef, whose acquirement of dividend means re-investment, has much to spare in the way of purchasing holdings of one sort or another, and so it may be that its buyings will close the tunings of the bears. It is queer that, in a comparatively easy money market, with general trade conditions favoring further and better developments, that prices should be all on the wavering side; but the fact remains that such is the case. In any event, good, ordinary sense should dictate the purchase of three gas stocks: Consolidated, of New York; Brooklyn (N. Y.) Union, and Peoples, of Chicago. No mistake can be made over buying them at the quoted rates. Consolidated was priced at the close at 192 to 194; Brooklyn Union at 208 to 215, and Peoples at 98 to 98¼. The general situation is also all in favor of purchasing, and about as good "a play" in the lot to hold for future good is Baltimore Consolidated, at anything under 70.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JULY 6.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	192	194
Central Union, Bonds, 5's	3,000,000	1,000	109	111
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	290	315
Municipal Bonds	750,000	.	..	
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	107⅛	108
Northern Union, Bonds, 5's.	1,250,000	1,000	106	107
New York and East River Bonds 1st 5's	3,500,000	1,000	110	113
" 1st Con. 5's	1,500,000		109	111
Standard	5,000,000	100	131	..
Preferred	5,000,000	100	132½	..
Bonds, 1st Mortgage, 5's	1,500,000	1,000	115½	118
Yonkers	299,650	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	208	215
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	⅜	⅛
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	7	10
" " Bonds, 5's	5,256,000	1,000	73	76
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central, San Francisco	1,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co..	29,500,000	100	96⅛	97
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101⅛
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89⅛
Preferred	3,026,500	100	107⅛	109
Consumers, Jersey City Bonds	600,090	1,000	100	102
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	57	67¼
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	380,000	1,000	85	87
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100		100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	981,000	1,000	77	79
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	60	70
" Bonds, 6's	2,650,000	..	102½	105
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	.
Preferred	2,500,000	100	92½	..
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		50
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	130	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	300	325
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	.
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	98	98¼
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	51½	52
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	95	96⅛
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	42	45
Bonds	2,047.000	1,000	98½	99½
Washington, D. C	2,600,000	20	315	325
First mortgage 6's	600,000	..	..	..
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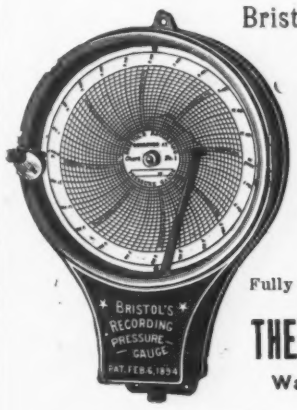

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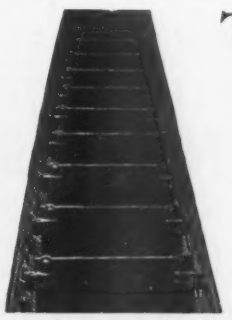

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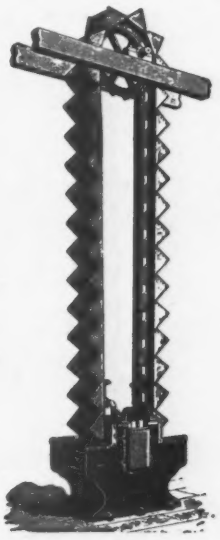

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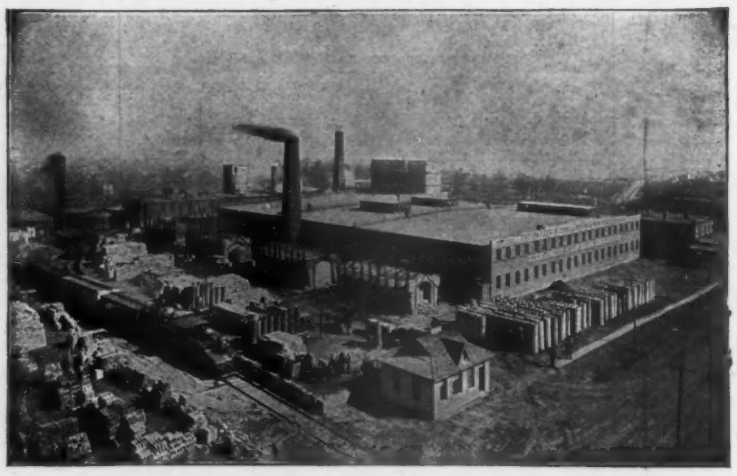

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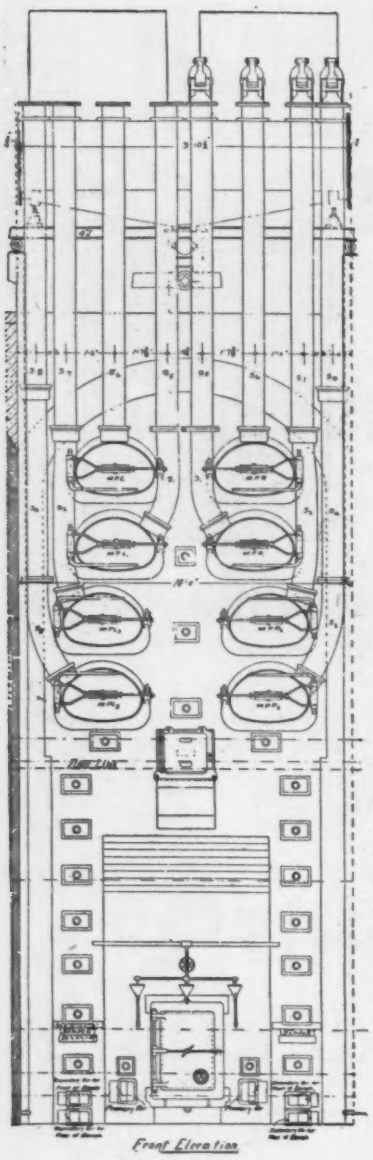

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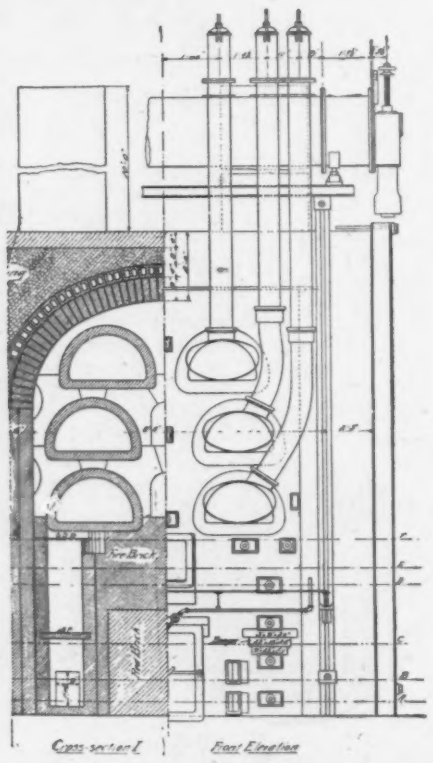

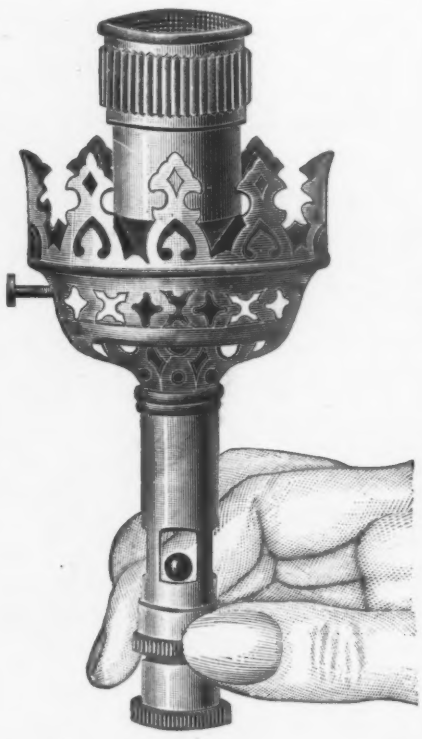

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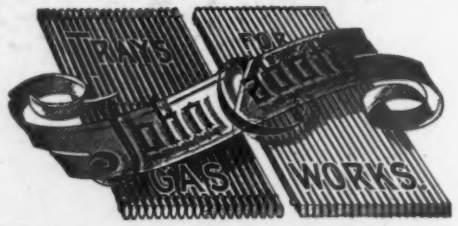

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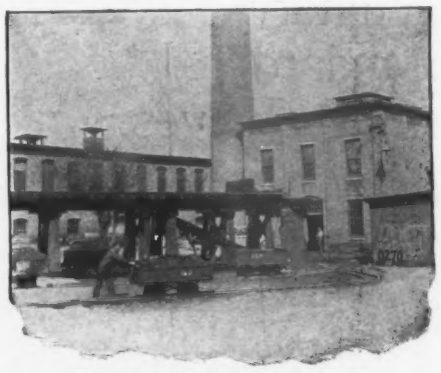

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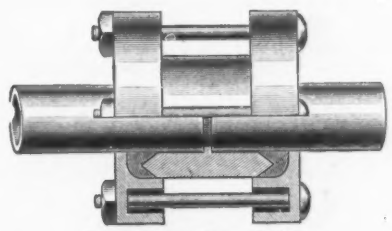
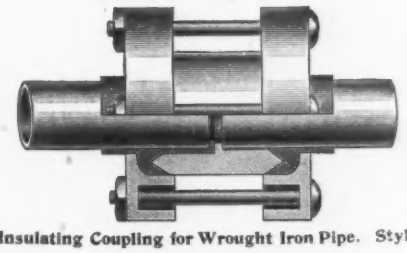
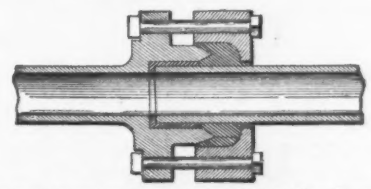


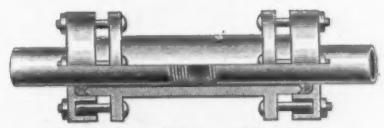
Regular Coupling. Style 1.



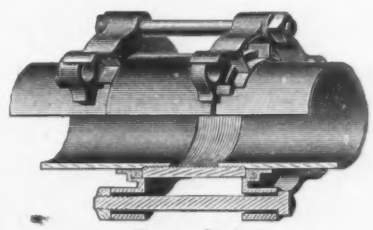
Insulating Coupling for Wrought Iron Pipe. Style 5.



Insulating Coupling for Bell and Spigot Cast Iron Pipe. Style 6.



Regular Sleeve. Style 2.



Clamp. Style 4.

Pipe Couplings, Sleeves, Clamps, Crosses, Tees and Ells.

My Insulating Coupling prevents the destruction of pipe by electrolytic action, in either water or gas lines.

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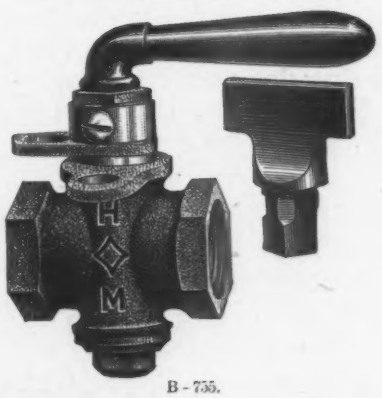

B-755.

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In **Mueller Gas Cocks** you find a happy medium--not so little metal as to leave them weak, nor yet so much as to make them costly.

Made in 145 styles, seven sizes in each style.

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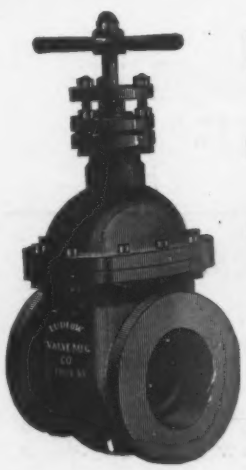

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Coal Gas Condensing and Scrubbing Apparatus.
Purifiers with Plain or Reversing Center Valves.
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Economize Heat in Water Gas Plants,

BY UTILIZING A

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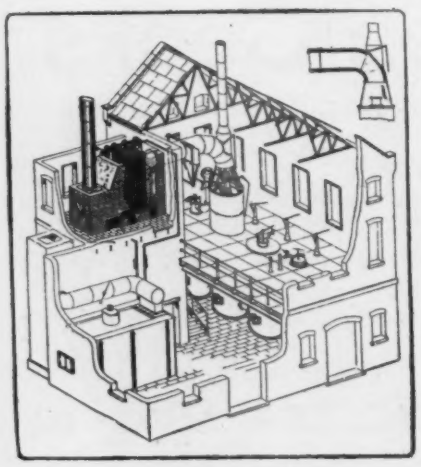

To absorb the heat now going to waste when you blow through your superheater to heat the feed water for your boilers to the temperature of the steam. This is now being done at the Poughkeepsie Gas Works, Poughkeepsie, N. Y. : : : : :

Write for full particulars how this is accomplished, the saving effected, and the advantages gained, to the

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MATTEAWAN, N. Y.

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Occupies this Space Every Alternate Week.

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HORIZONTAL GAS EXHAUSTER.

WE are building a line of Exhausters as per cut herewith, for forcing gas long distances and under pressures that are higher than ordinary pressures.

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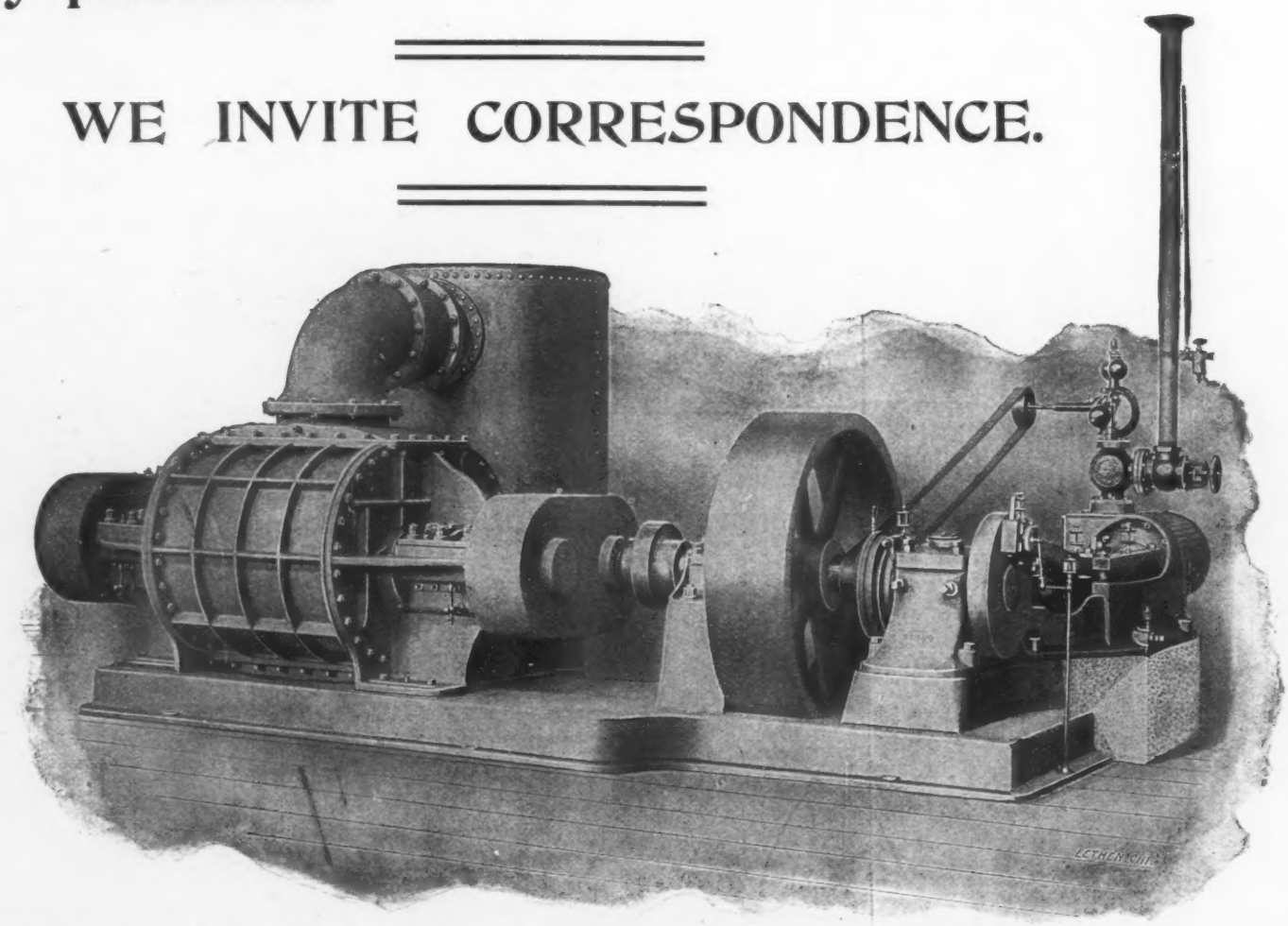

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WITHOUT ANY ESCAPE OF GAS.

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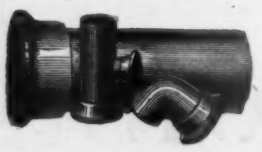

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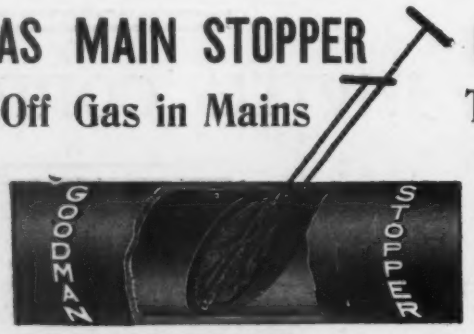

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IS A QUICK SELLER.

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HAS NO EQUAL AT THE PRICE.

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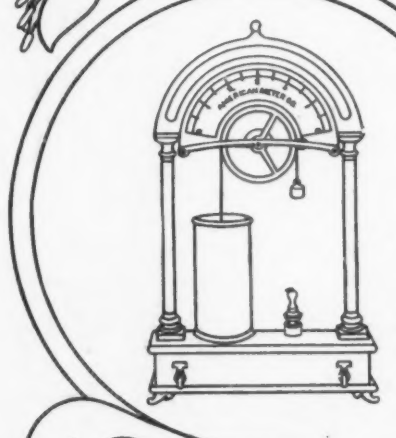
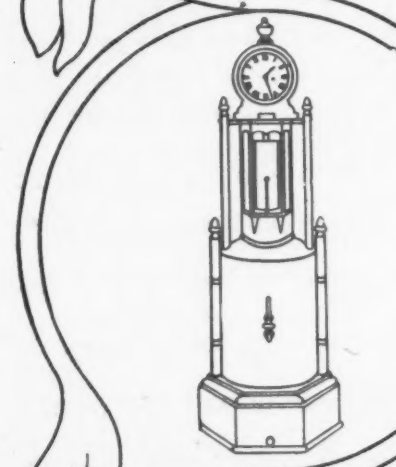
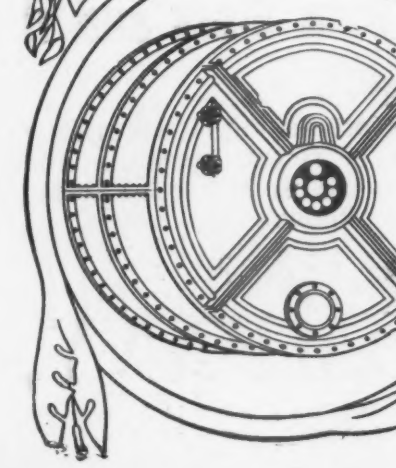
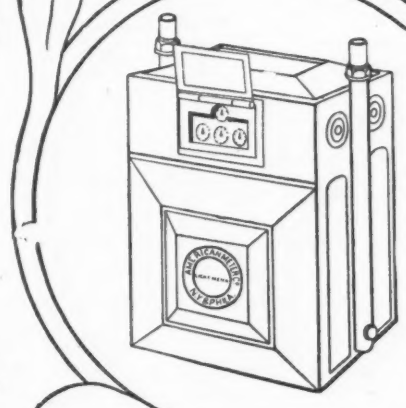
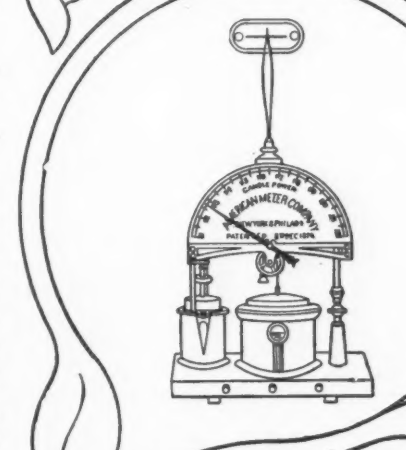
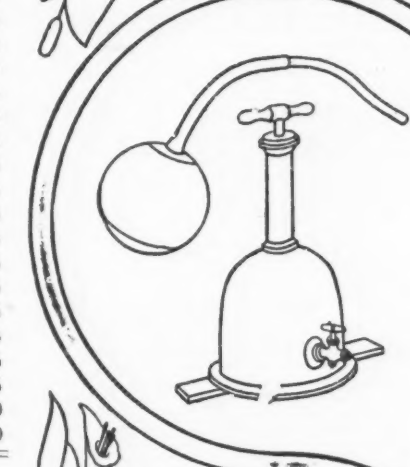


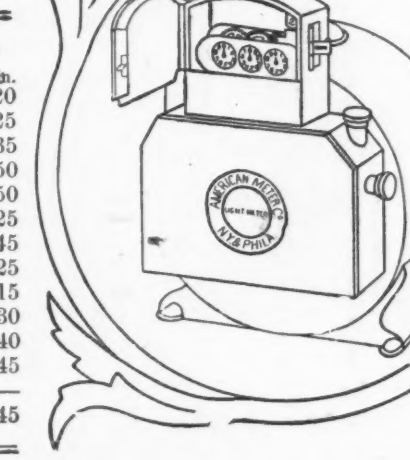












PUBLIC LIGHTING TABLE.

JULY, 1903.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Wed.	1	10.50 PM PQ	3.30 AM	7.30	3.15
Thu.	2	11.30	3.30	7.30	3.15
Fri.	3	12.00	3.30	7.30	3.15
Sat.	4	12.40 AM	3.30	7.30	3.15
Sun.	5	1.20	3.40	7.30	3.15
Mon.	6	2.10	3.40	7.30	3.15
Tue.	7	2.50	3.40	7.30	3.15
Wed.	8	No L.	No L.	7.30	3.15
Thu.	9	No L. FM	No L.	7.30	3.15
Fri.	10	No L.	No L.	7.30	3.15
Sat.	11	8.00 PM	9.30 PM	7.30	3.15
Sun.	12	8.00	10.00	7.30	3.15
Mon.	13	8.00	10.30	7.30	3.15
Tue.	14	8.00	11.00	7.30	3.15
Wed.	15	8.00	11.30	7.30	3.15
Thu.	16	8.00	12.00	7.20	3.15
Fri.	17	8.00 LQ	12.40 AM	7.20	3.15
Sat.	18	8.00	1.20	7.20	3.15
Sun.	19	7.50	2.00	7.20	3.15
Mon.	20	7.50	2.50	7.20	3.15
Tue.	21	7.50	3.50	7.20	3.15
Wed.	22	7.50	3.50	7.20	3.15
Thu.	23	7.50	3.50	7.20	3.15
Fri.	24	7.50 NM	3.50	7.20	3.15
Sat.	25	7.50	3.50	7.20	3.15
Sun.	26	7.50	3.50	7.20	3.15
Mon.	27	7.50	3.50	7.20	3.15
Tue.	28	7.50	3.50	7.20	3.15
Wed.	29	9.30	3.50	7.20	3.15
Thu.	30	10.00 FQ	3.50	7.10	3.30
Fri.	31	10.40	3.50	7.10	3.30

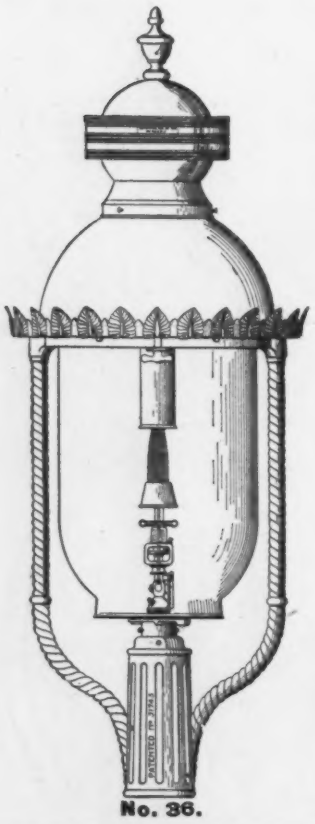
TOTAL HOURS LIGHTING DURING 1903.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	245.00	January	423.20
February	192.00	February	355.25
March	201.00	March	355.35
April	167.20	April	298.50
May	152.00	May	264.50
June	131.00	June	234.25
July	140.40	July	243.45
August	156.20	August	280.25
September	171.20	September	321.15
October	198.20	October	374.30
November	216.30	November	401.40
December	232.10	December	433.45
Total, yr.	2203.40	Total, yr.	3987.45

NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....


No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others Interested in Municipal and Outside Lighting.

No. 98.

The Welsbach Gas Arc for Indoor Lighting.

The cut tells the story—but not all of it. Get one lamp and light it—then the tale's told from beginning to end. For one Welsbach Gas Arc Lamp is a better salesman than 20 pages of advertising.

Here's what it would show if you give it a chance to prove its worth:

1. A mechanical construction and finish that insures the greatest durability.
2. The renewal of mantles and the cleaning of globes without removal of globe.
3. The greatest amount of candle power with least consumption of gas.
4. A by-pass cock so constructed as to permit all or only one mantle burning at a time.
5. A pilot light that consumes but 1 foot of gas in 24 hours. Costs $\frac{1}{10}$ of a cent a day.

Give it a Chance to Tell its Own Story and it Won't Disappoint.

Let us send you one lamp—doesn't cost a fortune—and it will answer every question you put to it; make good on every test given it. You know the only proof of the pudding? What's the use in a fellow telling you it tastes good? Taste it yourself, then you know.

May we Send you ONE Lamp?

WELSBACH COMPANY,

GLOUCESTER, N. J., and CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

For the Six Months Ending July 1, 1903, has been Awarded Contracts in the Following Places for

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Baltimore, Md.	Hempstead, N. Y.	Dover, Del.
Chicago, Ills.	Chester, Pa.	Allentown, Pa.
Amesbury, Mass.	Lynn, Mass.	Savannah, Ga.
Aberdeen, S. D.	Newark, N. J.	New York (Central Union Co.)
Winsted, Conn.	Washington, D. C.	Cicero, Ills.
Canon City, Col.	Boone, Ia.	Chicago (Ogden Co.)
Schenectady, N. Y.	Pueblo, Col.	Easton, Pa.
Hagerstown, Md.	Charlotte, N. C.	Lawrence, Mass.
Malden, Mass.	Fall River, Mass.	Council Bluffs, Ia.
Bridgeport, Conn.	Duluth, Minn.	Chattanooga, Tenn.
Albert Lea, Minn.	New York (Mutual Co.)	

TOTAL SETS TO JULY 1, 1903, ... 51
TOTAL DAILY CAPACITY, ... 55,150,000 cubic feet.
TOTAL SETS TO DATE, ... 498
TOTAL DAILY CAPACITY, ... 354,830,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

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Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

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FLEMMING GENERATOR GAS FURNACE

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RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

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Estimates Furnished on Application for Most Successful Style of Construction.

Also for Free-Firing and Full and Half-Depth Regenerative Benches, for Burning either Coal or Coke in the Furnaces.

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Works, Weber, N. J.
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Modern Recuperative Furnaces.

Standard Fire Brick and Gas Retorts.

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Construction Vertical 8's (Patented).
First Instalment in the World with Modern Charging and Discharging Machinery.

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Successor to WILLIAM GARDNER & SON.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,
BENCH SETTINGS,
Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

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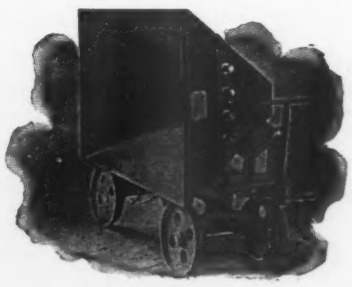

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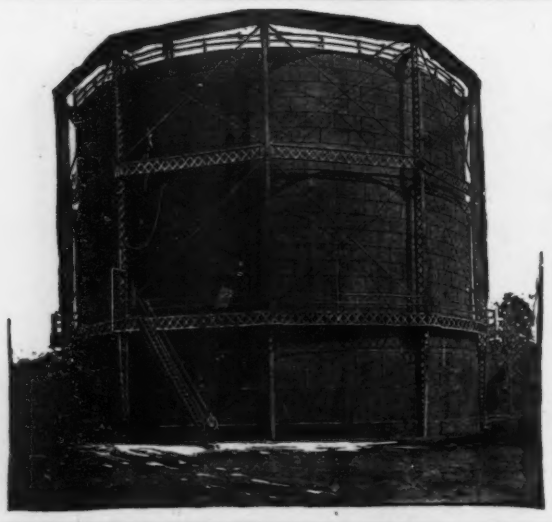

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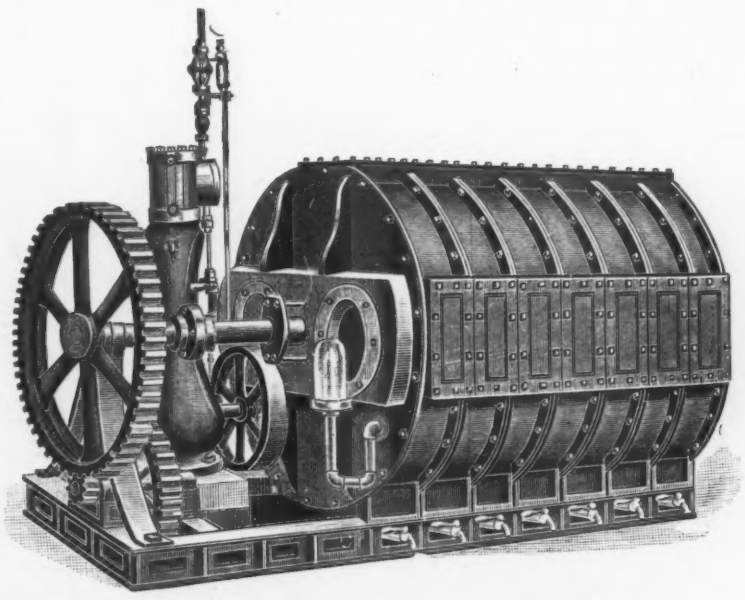

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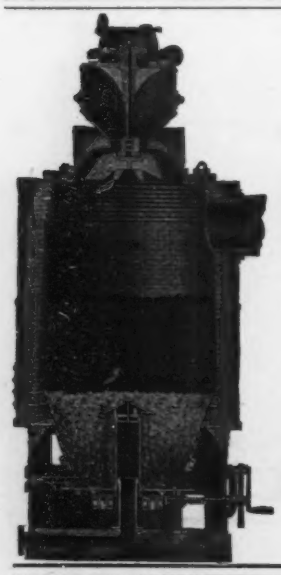

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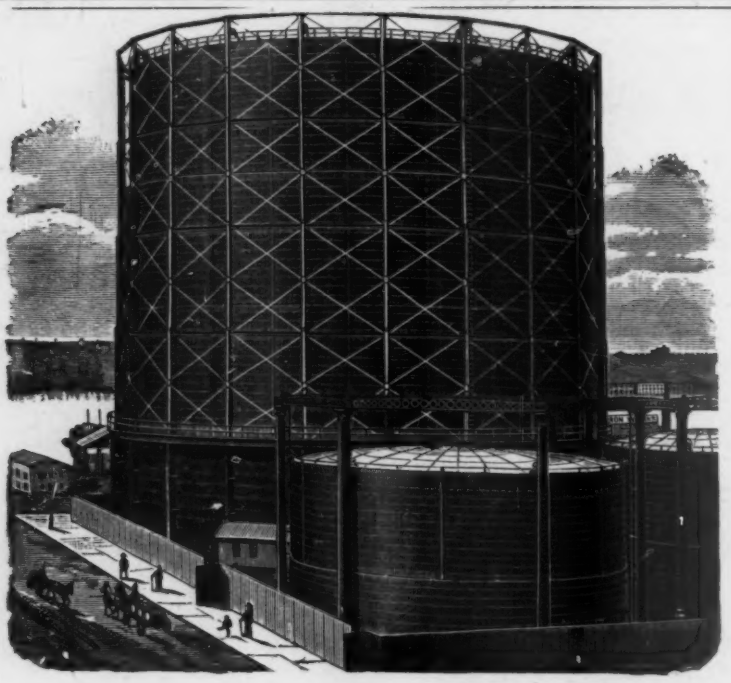

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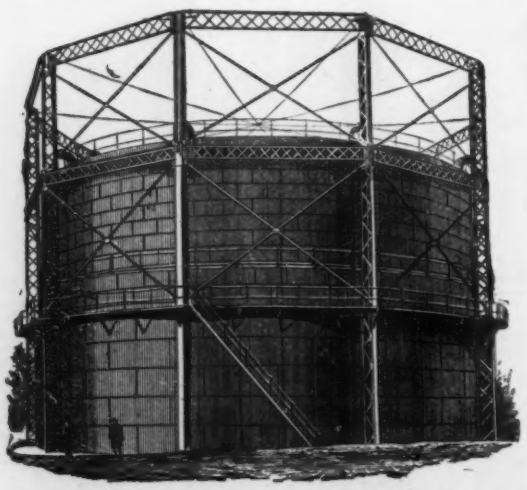

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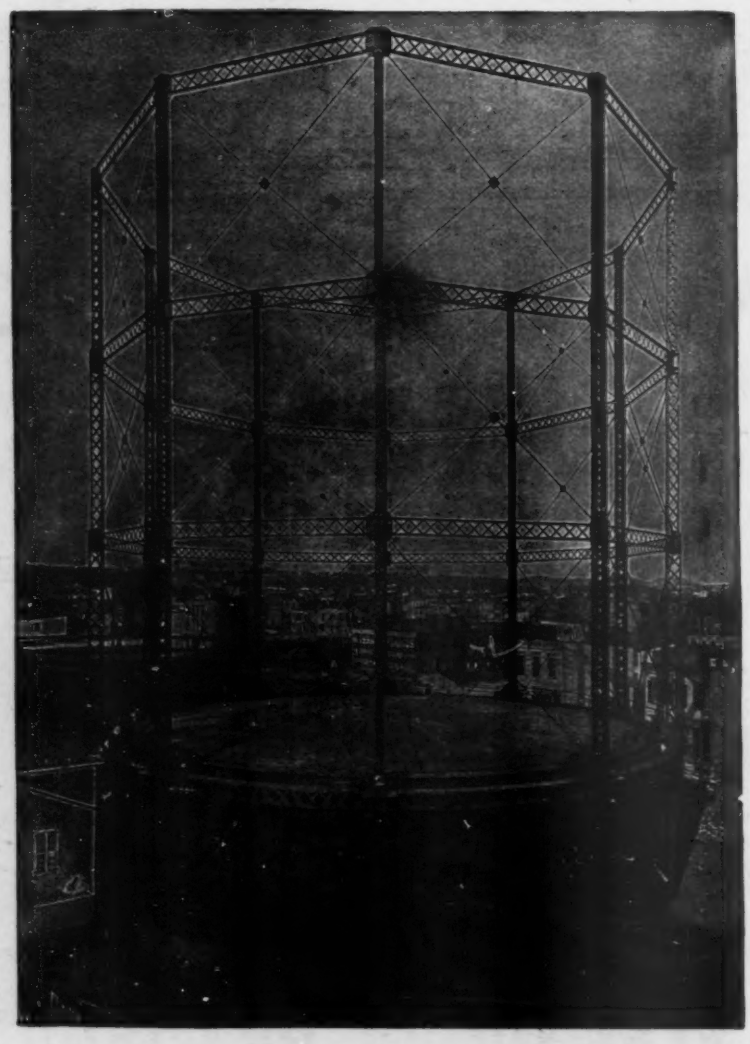

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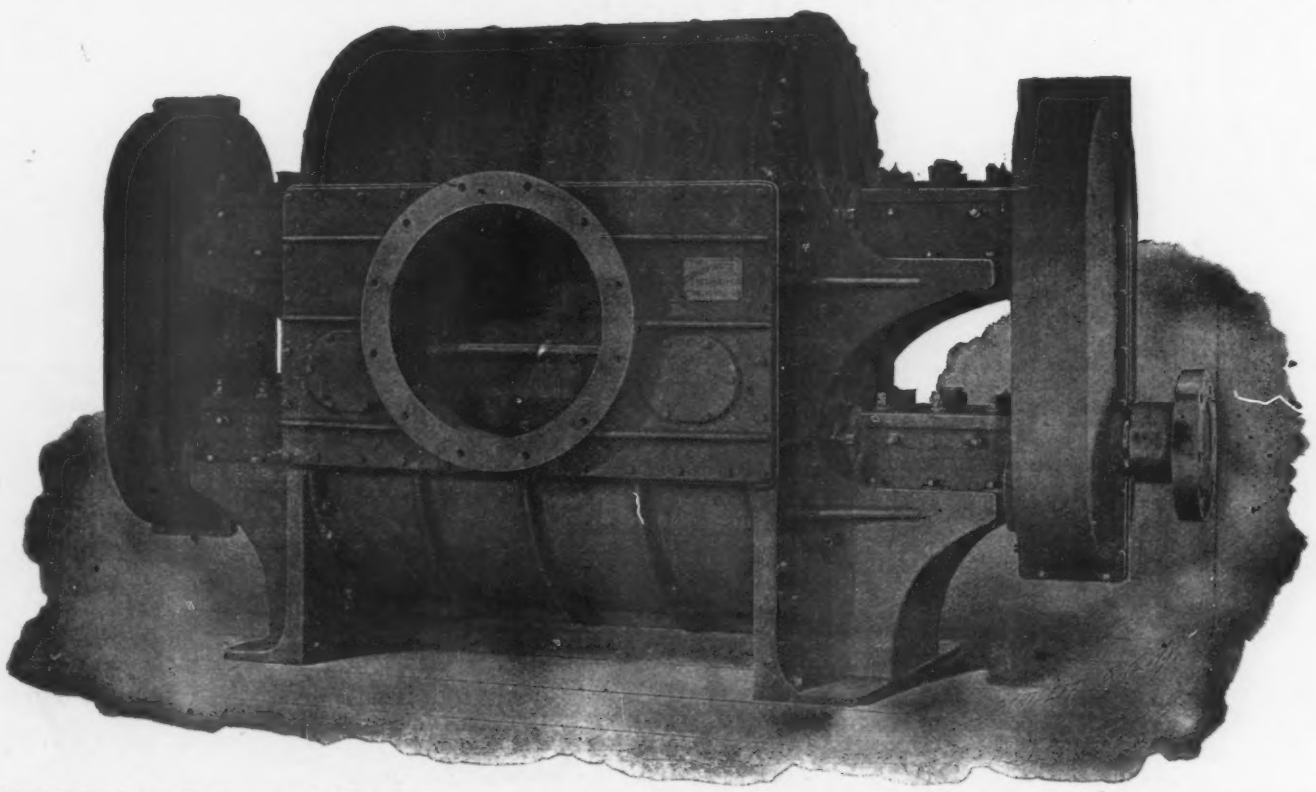

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